Creative Design Process in 3D:

The Exploratory, Quasi-Experimental Case Studies of Six Apparel Designer's Draping Processes

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ABSTRACT

The creative process of design cannot easily be defined. Designers possess the skills necessary to create a product that is novel and interesting, but cannot always easily explain their motivations, actions, or thought processes integral to the design process. For this reason, research cannot rely on verbal accounts alone. This thesis introduces a new way to research design process by presenting six exploratory, quasi-experimental case studies on the draping design processes of fashion designers. Data was collected using observation and photographic documentation in real time and combined with retrospective verbal interviews. Due the continuous nature of design process, each designer was asked to select a source of inspiration image which provided a necessary starting point. The relationships between this image and the design process allow a more clear understanding of how designers are borrowing, combining, layering, contrasting, and abstracting design elements and principles from both within- and between-domain sources. This new design research method provides a unique and uninterrupted view of the unfolding design process, and from the data collected critical actions by the designers can be determined, interpreted, and categorized in terms of its relationship to the overall process. The findings also discuss Individual motivations and design strategies, the role of fabric and the body, the relationship of sketching and draping processes, and some key differences between 2D and 3D design.

BIOGRAPHICAL SKETCH

Lindsey Marie Commons Milz was born in Cincinnati, Ohio. She received her B.S. degree in Fashion Design from the University of Cincinnati in 2005, and she will receive her M.A. from Cornell in 2011.

Lindsey was married in 2010 to Geoffrey Guy Milz, and together they have a daughter, Izebe Marie Milz, born July 11, 2011. She is formally trained in design, but loves all types of creative endeavors. She admires objects made by hand especially those where human presence can be seen or felt in the soul of the object. She loves to play with, learn about, and understand the natural and artificial world surrounding us, loves to create herself and admire others creations, and loves when people and objects have a sense of humor.

To Geoffrey & Izebe.

You inspire, support, and ground me. I would be lost without you both.

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LIST OF ABBREVIATIONS

CB.....center back

CF.....center front

SS.....side seam

RL.....right left

LR.....left right

horiz.....horizontal

vert.....vertical

diag.....diagonal

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Chapter 1

INTRODUCTION

1.1 The Use of the Word 'Design'

It is important to begin by distinguishing between the two uses of the word 'design': The first use is as a noun, as in the design of a dress, and the second use is as a verb, as in to design a dress. McCreight (1996) states that design is "both a noun and a verb. When we attempt to arrange parts in a way that is most efficient, attractive and/or meaningful we are engaged in the process of design. The result of this activity, which may be an intellectual property as well as a sketch or model, is also called design. As a verb, design refers to human activity. We don't think of nature as designing, though we often see configurations in nature that we call design. The process of design is rooted in intention… As a creative act, design is related to innovation in other fields…". Scott (1951) also referred to the difference in these two uses of the word design. He stated, "The old design was a noun… The new design is a verb. It connotes an activity that pervades every phase of contemporary life… the focus of attention changed from various specific kinds of designing to the activity itself. Design is now generally recognized for what it is: a fundamental human discipline, one of the basic techniques of our civilization."

The use of the word design as a noun indicates a tangible 'thing' that exits in the world as a product of the design process. It is a statement of a designer's intentions toward the creation of the object and is set within a specific context of time and space. Fashion designer AF Vandevorst stated, "Design is a language" (Jones & Rushton, 2005), and after asked to explain a new composition titled The Ring, musical composer Richard Wagner was said to have replied somewhat

testily that "it is the explanation" (Lawson, 1994). In addition, Steve Robinson stated, in regards to fashion designer John Galliano, the "story" for a collection "was always there, in John's head. And all the answers came out in the clothes" (McDowell, 1997). A designed product cannot easily be translated to words because the physical thing that has been created is the result of many contributing factors.

Design as a verb is concerned with the process leading up to the outcome of a product. The use of design as a noun is related to the use of design as a verb in the sense that they are dependent upon each other for existence, and either would cease to exist without the person engaged in the design process, whose goal is the creation of the designed product. Robley Wilson, Jr., a creative writer, stated, "We design, and we have designs on. Maybe the difference is between discovering order and imposing order" (as quoted in McCreight, 1996). In this description, the product of a design process could not "impose" its order without the order itself first being discovered through the design process.

In fashion design, there tends to be a strong interest in the product of design activity in both academic research (Kidd & Workman, 1999) as well as in popular culture. We are exposed to the products of fashion design through such means as runway shows, magazine ads, clothing stores, and street style, but we are rarely exposed to the process of the design activity that gave way to the creation of these designed products. It has been indicated that the design process plays a critical role in the formation of the product. As fashion designer Richard Nicoll stated, "Both the process and the product are important. In a way, the process forms the product's soul" (Jones & Rushton, 2005).

1.2 Types of Design Research

Design generally consists of four main parts: The person or persons who are involved in the design activity, the process of designing, the final product or outcome of the process, and the environment in which the design activity is occurring. Most design research tends to focus primarily in one of these four areas.

Research on the person or persons includes topics related to who is doing the designing and how they have come to understand and utilize the design process. Related research on this subject may include brain functions such as the acquisition of knowledge and use of memory, designer's own communications of their knowledge and understanding, the designer's biographical information, interviews, personality traits or characteristics of creative individuals, or distinguishing levels of creative ability, for instance, labeling a designer as an "expert" or "novice" in their field (Casakin & Goldschmidt, 1999).

Design process research explores how designers perceive their environment, what mental operations are employed during the design process, verbal accounts recorded during the design process, verbal retrospective accounts recorded after the process is complete, or behaviors exhibited in the interaction with others and/or their environment.

Research on the designed product analyzes the tangible object that is the result or outcome of the design process. Designed products are subject to multiple interpretations, regardless or as a result of the designer's intent, and may be judged in its corporal state by others as being successful or unsuccessful within the current context (Kidd & Workman, 1999). As it is a tangible entity of design that exits in the world, the product of design receives a majority of focus in design research.

The design environment may include both the physical environment, such as the studio space or design tools, as well as the social and cultural environment, either on a personal level,

in the industrial setting, or on a global scale. Research on the design environment may include types of physical environments or design tools conducive to practice, studies of the design organizations, or the forecasting and analysis of trends.

1.3 Focus of This Research: The Apparel Design Draping Process

Apparel design is both similar to and different from all other design processes. The generic design hypothesis (Visser, 2009) suggests that the basis for design process is essentially the same across all fields; however, each field has their own particularities related to design. All designers' design for other people (Visser, 2009), but some fields are more intimately connected to the creation of the product than others. As opposed to architectural design, apparel design is a field in which many designers have experience actually making the product with their own hands. I believe the designer's experience of the process may result in some differences in the overall design process. Sheldon (1967), in her book on design draping, believes that "few activities produce a great a sense of satisfaction as those which are manipulative and require self-discipline to accomplish them." She observed that a designer may start with one detail "and let the idea grow from there" allowing the fabric to "talk" to the designer as he or she is interpreting the idea.

Another characteristic difference in apparel design is that the starting point of the design process is always the human body. The human body gives the designer a base form from which to begin designing. Fashion designer Donna Karan stated, "each season I start where I began- with the body" (Karan, 2004) and Armani (2000) describes how he "undresses" a woman in order to clothe her. In addition, the designer may also choose to manipulate the body form itself by building up or constraining certain areas to create the illusion of an increase or decrease of body

volume, such as through the use of padding, boning, corsetry, or other methods. The role of the fashion designer is to select fabric or other materials, and then decide in which ways to cover certain sections of the body while leaving other sections uncovered. Bill Gaytten, who worked with fashion designer Galliano, described design as "…finding the limits of what you can do when wrapping the body in fabric. Everything evolves. Nothing is strictly defined" (McDowell, 1997).

Generally, apparel design is developed once a design is conceived in one of two fashions: through a 2D sketching process, or through a 3D draping process. In order to construct a garment, the designer must first create patterns. There are two ways to accomplish this: Through flat patterning, and through draping. In both situations a designer is creating patterns; the difference is that "flat patterning is the study of garment construction in two-dimensional form" (Kim & Uh, 2002) while draping is garment construction in 3D. Flat patterning may very well "combine all the best elements of design, technical understanding, and creativity" (Kim & Uh, 2002), but the use of this method may also not allow the designer to "visualize the finished design correctly" (Sheldon, 1967) and may result in dissatisfaction in the end result.

Fashion designer Galliano stated, "The most exciting discoveries, the marvelous moments aren't with the sketchbook, but in the making" (McDowell, 1997). For this research, I wanted to explore the design process when participants actually create a garment in 3D, as opposed to only sketching a representation of that garment in 2D, so I chose to study designers who engage in the draping process. For this study, the focus was not on pattern making but on the design development to allow the designer freedom for exploration of ideas with the fabric in 3D space.

As this project is exploratory in nature, it is primarily focused on observational research.

I remain open to any and all results, whether they are obvious or surprising, however, I focused my interest in this research on exploration of the formation and development of design ideas during the apparel design draping processes by asking the following questions: What are the initial design ideas borrowed from the provided source of inspiration and how are they translated into apparel design elements? How do those initial ideas develop and change during the progression of the draping process in terms of design elements and principles? What methods and strategies are employed by the designer during the draping process? What is the role of fabric and the body in design draping process? How are sketching processes related to draping processes? What are the differences in thought process and design method between 2D and 3D design? What overall characteristics are embodied in the draping process?

Chapter 2

LITERATURE REVIEW

2.1 The Relationship of Creativity to Design

Design is a creative process requiring mental operations and actions that result in the production of a tangible, or "artificial" (Simon, 1996) object. Design can be understood as a creative process, requiring the ability to think creatively. Therefore, literature on creativity and creative thinking also applies to designers and design process.

2.11 Definition of Creativity

Creativity is a difficult word to understand and define (Hennessey & Amabile, 2010). Some view creativity as an everyday, normal ability (Mandler, 2004; Welling, 2007), while others view the creative individual as a gifted genius, occasionally bordering on a madman. Herbert Simon (2001) stated, "We judge thought to be creative when it produces something that is both novel and interesting and valuable." However, this definition of creativity focuses on the outcome or product, as opposed to the integration of all the aspects (including the person, process, and environment) that facilitated the creation of the product. This widely accepted definition is "defined by two aspects of its consequence and not the process that led to the consequence" (Halpern, 1984).

2.12 Stages of the Creative Process

The creative process is thought to consist of four stages (Wallas 1926). The first stage,

preparation, consists of researching or understanding the problem. The second stage, incubation, involves the consideration of the problem. Sometimes referred to as the gestation period, information from the environment can be processed subconsciously (Higgins 1994) in this stage. The third stage, illumination, happens when a new idea is conceived, and is sometimes known as the "aha!" moment (Adams, 1986), or the "creative leap" or "creative bridge" (Cross, 1997). Illumination, can be created through the combination of ideas, the mutation of an existing idea, or through analogy (Cross, 1997). The last stage, verification, involves testing of the idea in plausible circumstances.

2.2 Mental Operations in Creative Cognition

Creativity is not only evident in our actions onto the world that create a product, but also the operations of our minds. We could not create without the mind's cognitive abilities. Niesser (1976) stated, "Cognition is the activity of knowing: the acquisition, organization and use of knowledge." Knowledge structures are our "personal internal representations about the natural world" (Halpern, 1984), and our behavior is action based on knowledge (Niesser, 1976). Our knowledge allows us to understand and make sense of a new situation as well as implement and evaluate changes into the environment. According to Jean Matter Mandler (2004), there are two types of knowledge, declarative and procedural. Declarative knowledge is knowing that something is a certain way. This type of knowledge is readily available in our consciousness, and therefore we can think about and reflect on this knowledge. Procedural knowledge, on the other hand, is not readily accessible to our consciousness, and therefore may be difficult to describe in words, sometimes only referred to as an intuitive feeling. It is an unconscious mental operation of knowing how to do something, which may not be easily described with words. Since both

operations play a role in designing, it is important to understand not only what a designer says and does, but also to understand how the designer's mind is operating.

2.21 The Brain, Knowledge, & Perception

Herbert Simon (1996) compares the human brain to a simple information-processing machine due to its inability to perform more than one operation at a time and its limitations of processing and storage capacity. Hogarth (1987) identified four consequences of the limited human information processing capacity: perception of information must be selective by our minds, information processing is done in a sequential manner with minor adjustments over time on the basis of new information, the processing capacity of the mind is limited so heuristics (Simon, 1996) (or rules of thumb) are needed to reduce the mental effort in recalling information from the memory stores in the brain, which is limited in capacity.

Our brain's memory stores are made of two basic kinds: Short-term and long-term. Short-term memory storage is small in capacity but features a quicker retrieval of information, while long-term memory storage is relatively large but is more difficult to access. Information perceived by the brain is stored by way of "chunks" (Simon, 1996) in both short-term and long-term memory consisting of three or four grouped units. At any given time, the number of units your brain can hold in short-term memory is only around seven (Miller, 1956). For example, the seven-digit phone number 777-9999 contains two 'chunks' of digits. The groupings of 7's and 9's are each one chunk made up of three to four units of information. It is believed that our mind stores information in precisely the same way, and if the chunks in short-term memory become stored in long-term memory they are thought to become composed into a hierarchically organized structure for accessible use in later retrieval and application (Simon, 1996; Koestler, 1978).

Our knowledge would not be of much use to us if we were not able to access it in order to think. Much like the existence of conscious and unconscious knowledge, there is also conscious and unconscious processing of that knowledge, or thought. Mandler (2004) makes the distinction between procedural and declarative knowledge as types of representation, and uses the terms implicit and explicit as types of processing that occur in the mind. Perception is an implicit, unconscious process, and thought is an explicit, conscious process. Oxman (2002) describes these same two integrated and complementary levels of thinking in terms of visual processing. She describes low-level processing as being related to the perception of visual stimuli such as shape, color, line, etc. In other words, knowing what the object is, rather than what the object is about. High-level processing, on the other hand, is related to visual cognition, or knowing about the object. This is a form of rational thinking where we compare what we are seeing to what we have already seen, which is accessed from stored information.

Neisser (1976) stated that, "Perception, like evolution, is surely a matter of discovering what the environment is really like and adapting to it." Perception is the selection of information from the environment by our minds. Neisser (1976) also stated, "perception and cognition are usually not just operations in the head, but transactions in the world. They do not merely inform the perceiver, they also transform him. Each of us is created by the cognitive acts in which he engages." This view of perception supports the idea that we make the world in which we live. We not only construct and internalize meaning by perceive visually, but we also "see" by making judgments, and becoming aware of something (Schön, 1992), such is the case with Gestalt psychology. In psychology, the term Gestalt literally means "whole" and this branch of psychology believes that humans are prone to visually seeing in terms of wholes rather than fragmented parts (Köhler, 1947). There is a predisposition of our brain to think in absolutes, reshaping our per-

ceptions as conceptual absolutes or abstractions (Anderson, 1992). Adams (1986) considered an important aspect of creativity to have the capacity to "see" from new viewpoints, and as Langer (1951) observed, "most new discoveries are suddenly seen things that were always there."

Donald Schön (1983) described a designer's conscious thought as 'reflection' that occurs during the design process. Often, a designer will stop designing in order to examine and critically evaluate their work at various stages of completion. Rational thought, since it is available to the conscious mind, can be translated verbally much more easily than intuitive thought, which is understood as an unconscious process. As opposed to rational thought, intuitive thought is to know something without the use of rational thought, or to become instantly aware of something without knowing the source of that knowledge or means by which one obtained it (Genter, 1989). It is a proposed existence of "automatic cognitive processing which respond to meaningful stimuli, do not require attention or effort, and occur very rapidly" (Shiffrin & Schneider, 1977) and is essentially inaccessible to our conscious awareness (McClelland & Rumelhart, 1986). Therefore, we are not able to "think" about intuitive thought in the same conscious manor that we can "think" about rational thought, so it remains unknown to us. However, both rational thought as well as intuitive thought play an important role in design. Architect Ken Yeang stated, "I trust the gut feeling, the intuitive hand, the intuitive feel about the project…" (Lawson, 1994).

2.22 Creative Thought

Max Müller observed that "cogito," Latin for "to think" etymologically means "to shake together" (Hadamard, 1996). Biological research has shown there to be two opposing biological tendencies of forming hierarchical structural units of information and the units becoming increasingly isolated (Bonner, 1988). Our minds are also continually constructing hierarchi-

cally organized information in this same way (Simon, 1996; Koestler, 1978). New combinations of information form a "creative bridge" (Cross, 1997) that results in linking two structures of knowledge and the formation of new associations, critical to creative thought (Hogarth, 1987). Many creative individuals have stated the importance of forming combinations during a creative process. Einstien referred to a "combinatory play" (Ghiselin, 1952) that he deemed to be the essential to productive thought. Kukle's (in Hadammard, 1996) famous discovery of the circular shape of the Benzine molecule was described in terms of the combination of existing units of information, creating a bridge between them that resulted in a novel idea. The poet Paul Valéry stated his creative process consisted of two stages, the building up of combinations, and selecting among those combination that have been built (Hadamard, 1996). Also, fashion design team Stüssy described their work as "remixing" (Jones & Rushton, 2005).

Designers also reference the importance of play to facilitate create thought, and in the examination of various forms of play, Leiberman (1977) found that combinatorial play traits were related to divergent thinking, known to be an important aspect to creative thought (Runco, 1991). Leiberman (1977) stated, "playfulness arises in familiar physical settings or when the individual has pertinent facts; the imagination enters by twisting those facts into different combinations, not unlike the operation of a kaleidoscope, and that the end product may, by the quality of its uniqueness be labeled 'creative'."

Not only are combinations important to creative thinking, but it has been stated that contrasting combinations may provide the basis for a higher level of creativity. Mathematician Poincaré observed that, "To create consists of making new combinations of associative elements which are useful… Among chosen combinations, the most fertile will often be those formed of elements drawn from domains which are far apart" (Hadamard, 1996). In addition, fashion

designer Christian Lacroix (1992) referred to his design process as a "complex alchemy of rich oppositions," that is based on "combining things that are normally contrasted."

The use of analogy can facilitate these creative combinations. Analogy is the mapping or transfer of knowledge from one subject, or source, to another subject, or target (Holland, 1986). In the case of apparel design, the source includes the designer's previous knowledge and design constraints placed upon them, such as the three-dimensional body form, inspiration garment or image, and limited number of fabrics, while the target is the goal of a finished garment. It is a form of reasoning where we apply information that is known to something that is unknown (Casakin & Goldschmidt, 1999), and there has been shown to be a strong link between analogy and the creative problem solving process (Adams, 1986). The use of analogy can create links in both structural and superficial hierarchies of information (Goldschmidt, 2001), both of which can contribute to the illumination (Wallace, 1926; Hadamard, 1996) stage in creativity. As Aristotle stated, "To be a master of the metaphor is a sign of genius, because a good metaphor implies an intuitive perception of similarity between dissimilar things" (McCreight, 1996).

Analogy can occur both within-domain, meaning an idea is transferred from a source within a particular field, or between-domain, meaning an idea is transferred from a source outside of a particular field. In the example of apparel design, within-domain inspiration could either be borrowed directly or changed in some way. For instance, a certain collar style may be borrowed exactly as observed and incorporated into a new design, or that collar may be altered slightly from the original. A between-domain inspiration would always be translated into apparel deign elements from any other outside sources.

2.3 Design

2.31 Components of Design: Elements and Principles

In any given system there are only a finite amount of base elements with which to work. Basic patterns, such as spiraling or branching, are repeated in analogous situations in many species (Stevens, 1974). For example, the roots of a plant as well as the veins in our bodies follow a similar branching structure. This base structure is repeated, but varied based on the suitability of function across as well as within a species. If, for instance, the root encounters an obstacle such as a rock, it will adapt its growth to avoid the obstacle, resulting in root structures from the same species of plant that appear both similar and different.

Designers also repeat successful elements from one design to another, such as fabrics or colors in fashion design, or even successful themes from one collection to another. Sometimes these elements are repeated exactly, sometimes they are varied slightly from the previous elements, and sometimes they are opposing, or contrasting the previous element, which in this case employs the most change possible.

Currently, there is no consensus on exactly what is classified as a design element or principle of design (Johnson, 1995). The simplest definition is, "The elements are the things that we work with, the principles are what we do with them" (Malcolm, 1972).

Davis (1996) stated that design elements are "the basic ingredients or components from which a visual design is made." She also determined that every element has its own qualities or aspects and each aspect has many variations. For example, the element of line has one aspect of direction with variations of vertical, diagonal, horizontal. Euclid (1956) characterized elements as having position, magnitude, and belonging to a particular species.

Design elements could be considered as point, line, surface, and form among many others. All of these elements build on one another, all of the former ones being included in the

latter in the order in which they appear. Point is considered to be "the simplest of all elements" (Baldinger, 1960) Point is characterized by having a fixed position and may appear as a focal point in a design. Multiple points can create a "complex of tensions and interactions" (Baldinger, 1960) and become points of focus as well as points of departure to look at other points, which can create a feeling of movement. Line, as defined by Euclidean geometry (Euclid, 1956), is the shortest path between two points, thus containing direction as well as position. Line is "the element which we are continually abstracting from nature… It stands for what we see as contours, the apparent edges of objects when seen in one position, and it serves in this way to symbolize natural forms" (Baldinger, 1960). Because line has direction it can guide our eyes, and suggest movement or emotion. Plane, or surface is a 2D space created by the edges of line, and is characterized as having length and breadth (Euclid, 1956). The lines on the edges of a plane delineate contours, as well as distinguish 2D positive and negative space. Surface also allows space to create texture, or the "feel" to a plane (Baldinger, 1960). Form, which includes with it all previous elements, is characterized by 3D mass and volume. Like surface, form can also be described in terms of positive and negative spaces.

Although each element is introduced separately, "in practice we shall never find them by themselves but always in combinations" (Baldinger, 1960). One or another element may dominate "but always in conjunctions with at least one other element… The work of art is unity and every element it contains needs the help of other elements to bring it into being, even as nerve cells need the help of blood cells and other cells to make the body function." (Baldinger, 1960).

Baldinger (1960) stated, "…we must recognize its elements as essential to its structure. We must recognize, at the same time, the ways in which its elements are joined to compose the work's whole." The composition of design is merging elements, that is "the putting together of

lines, masses, and colors to make harmony" (Dow, 1913). Leonardo Da Vinci stated, "Do you know that your soul is composed of harmony and that harmony is only produced when proportions of things are seen or heard simultaneously?" (Da Vinci in Richter, 1998). When we speak of design principles, we are referring to the ways in which we put elements together into a composition to create this sense of harmony. Design principles are defined as "…guide line or method for manipulating an element to create a specific visual effect" (Davis, 1996). Davis found repetition and contrast to be the most fundamental of all principles, all of the other principles being inherent in these two concepts or contributing to them. Smolucha (1996) defined repetition and contrast as the fundamental principle of organization, and stated, "analogy is found in visual design when a single element is repeated over and over… Most successful compositions, therefore, aim at achieving a balance between repetition and contrast."

Other important principles of apparel design are symmetry and proportion. Symmetry can be seen as being symmetrical, or formally balanced, or as asymmetrical, or informally balanced. Informal balance may appear balanced to the eye as a "restful composition" (Goldstein & Goldstein, 1954). Proportion refers to the "relative sizes of elements in a composition" (Smolucha, 1996), and it is sometimes called the "law of relationships."

2.32 The Design Process: Approaches to Research

Just as there is no clear definition of creativity, there is also no clear definition of design and design process. Significant approaches to understanding design process are discussed below.

2.321 Design Process as a Problem

Design, when viewed as a problem, is not considered a well-defined problem where there

exits one perfect solution. Instead, design is considered an ill-defined, or "wicked" (Rittel, as cited in Bayazit 2004) problem due to its lack of initial and end conditions, as well as its nature of complex, interdependent, and changeable relationships between parts (Simon 1996). The designer must determine the initial and end conditions based on incomplete information, and must develop the design and make decisions under conditions of uncertainty. Certain requirements in either set of conditions may exist, but they are usually defined by the designer, and most often incomplete and vaguely defined at best.

There also cannot exist a definitive starting point, even with a source of inspiration or clearly stated design problem, because designers draw from their previous knowledge and may apply that knowledge to analogous situations. There is also no definitive end point, and since a perfect design solution does not exist as it does in a well-defined problem, a designer is not searching for optimal solutions, but instead must find a 'satisficing' (Simon, 1996) solution that may meet some requirements, while comprising, eliminating, or re-defining others. Inductive thought, defined as "all inferential processes that expand knowledge in the face of uncertainty" (Holland et al., 1986), may be an important contributor to decisions made under these conditions.

Design, viewed as a problem to be solved, requires the designer to generate many solutions and then selecting among those that have been generated (Simon, 1996; Higgins, 1994). "Intelligo," the root of the word intelligence, was observed by St. Augustine to mean "to select among" (Hadamard, 1996). To discern is to select among many options, and the process of discovery, or invention can also be viewed as a choice (Hadamard, 1996). Michael Wilford, an architectural designer, described design as "a very systematic process of options and selection" (Lawson, 1994),

2.322 Design Process as Interaction

As Irish playwright George Bernard Shaw stated, "Things have not happened to me: On the contrary, it is I who have happened to them" (Wallace & Gruber, 1989). When considered as a verb, design is not thought to be merely the indication of actions, but the indication of an engaging and continuous interaction between the designer and the world in which they are designing. It is not one single act with a definite beginning and end, but an ongoing and generic (Goel & Pirolli, 1992) system of change. Donald Schön (1983) describes this interaction as a 'conversation' taking place with one individual, the designer, and dependent on the environment in which they are designing. His book The Reflective Practitioner was instrumental in promoting this constructionist view of the application of specialized design knowledge during 'reflection-in-action' in which the designer is constantly evolving and changing thought process and behaviors as his environment evolves and changes. He coined the term 'see-move-see' as an explanation of how a designer perceives and makes judgments about stimuli and then acts upon and alters the design based on the previous judgments and perceptions, and with each new action, the designer has created a new situation to be perceived and judged. The designer may 'speak,' in a sense, by performing an action, which then becomes a visible change in the design. This changed design then provides feedback by 'speaking' to the designer as a new situation to be perceived and judged. The artificial world is shaped through the designer's making of it, and in turn shapes the designer through their making it. Perception and cognition functions vital to the design process are not just operations in the head, but "transactions in the world [that] do not merely inform the perceiver, but also transform him" (Neisser, 1976).

In the beginning of a design process, the design solutions, at first, may be rich in possibilities, but every design move, or decision, by the designer results in limiting the scope and range

of possibilities (Volkema, 1983). Each new decision in effect nips in the bud a great number of other possible solutions (Von Bertalanffy, 1950). Sir Frederic Bartlett (1958) observed that in an artist's thinking as they "fill in a gap, they open up many more" (Bartlett, 1958). Like artists, designer's decisions help to shape the future outcome, or product.

Generally, people are unaware of how they make decisions or why they prefer alternatives (Hogarth, 1987). Hogarth believes that these decisions are predictive anticipations of the future based on judgment, which is an intuitive expression for preference. Leonardo Da Vinci stated, "To know and to will are two operations of the human mind. To discern to judge to reflect are actions of the human mind." (Richter, 1970). Dow (1913) stated, "Good drawing comes from trained judgment, design is preparation for drawing, not the other way around." Judgements are the evaluations of decisions, and are key to critical thinking (Halpern, 1984).

Although humans may be equipped with the means to process information in a certain way, two people will not process information in identical ways because they are actively choosing to participate in the world by their perceptions and actions. All of us, on a daily basis, are faced with an immense array of stimuli in our environment. We must reduce this disorder by choosing what to perceive, or to select from the external (Mandler, 2004), and then proceed to make judgments about those selections as to whether or not they match with the goal or directions that was intended.

Designers may show physical evidence of judgment and reflection during their own design processes by at one point working in detail, and then at another point taking a few steps back to examine if the detail is cohesive with their understanding of and intention toward the overall whole (Yokochi & Okada, 2005).

2.323 Design Process as a System

Recently, there has been an interest in a systems view of creative process, such as design. Hennessey & Amabile (2010) stated that a "deeper understanding of creative behavior will require more interdisciplinary research based on a systems view of creativity that recognizes a variety of interrelated forces operating on multiple levels." Ludwig Von Bertalanffy's General Systems Theory describes a system as "a complex of interacting elements." Complex systems are "made up of a large number of moving parts that have many interactions" (Simon, 1996). The system as a whole is something greater than the sum of its parts, and the parts cannot be deduced from the whole. The behavior of the parts in isolation is often useful to observe, but the behavior of the overall whole cannot be summed up from the behavior of the isolated parts (Von Bertalanffy, 1950). Koestler (1978) referred to this idea as 'holism' and suggested that the interrelated parts of a system form Janusian relationships which consist of subordinate and superordinate elements, each dependent upon and unable to be separated apart from the others. The two-sided face of Janus looks both forward and backward simultaneously, illustrating the duality of the codependent relationships between elements. Simon (1996) went on to say that "complexity frequently takes the form of hierarchy and that hierarchic systems have some common properties independent of their specific content," such as their structure and relationships between elements. As opposed to a linear model of hierarchical relationships, Simon proposed they are organized in a "boxes-within-boxes" type structure, and that the relationships between the different levels of hierarchy are not stationary but constantly changing and adapting. In order to survive in the changing environment it is a requirement that all systems must be adaptable. Any change in the environment can lead to a change in the system, and any change in the system can lead to a change in the environment. Our previous knowledge about the environment allows us

to understand and make sense of these changes around us, and communicate them in the form of a designed product. Complex systems also do not just passively respond when adapting, but actively search for advantages and opportunities to learn from experience (Waldrop, 1992). From a biological standpoint this "capacity to learn and invent and instruct" (Bonner, 1988) is inherited.

Von Bertalanffy also described a characteristic of systems as having an "inflow and outflow of materials," where every part of a system is dependent on each of the other parts as well as some sort of "feedback control" (Von Bertalanffy, 1950; Koestler, 1964) from the environment. No open system exists as an isolated phenomenon, but is integrated with and dependent on its environment. Feedback during the design process can not only inform the current direction of design, but also introduce new inspiration or direction to the designer in the form of design emergence (Cross, 1997, Oxman, 2002) whereby the designer sees and is inspired by something that has visually presented itself to the designer as the design was being created. An emergent inspiration is not something that was planed ahead of time, but discovered or revealed during the process itself whether it was by means sketching, draping fabric on a form, or otherwise. Architect Santigo Calatrava (Lawson, 1994) describes his projects as "layer after layer" and referred to this idea of emergence as continually "discovering layers of your project." Fashion designer Givenchy (Mohrt, 1998) describes a similar process of emergence as elaborating upon subtle details "which reveal themselves little by little rather than immediately." Architect Herman Hertzberger (Lawson, 1994) stated, "A very crucial question is whether the pencil works after the brain or before. In fact what should be is that you have an idea, you think and then you score by means of words or drawing what you think. But it could be the other way round, that while drawing, your pencil, your hand, is finding something…" Architect Richard MacCormac also referred to discovery by stating that he uses drawing as "a process of criticism and discov-

ery" (Lawson, 1994).

Due to feedback during the design process, as well as to the limited information processing capacity of our brains (Simon, 1996), it would be impossible for a designer to plan in advance each action needed in order to complete a design. Fashion designer Christian Lacroix (1992) stated, "A show is not an end itself. Why make another collection if everything is planned in advance?" Picasso also understood his design process very clearly, in stating that a painting was an attempt to "materialize a dream" piece by piece until achieving a cohesive whole. While painting Guernica, he stated, "a picture is not thought out and settled beforehand. It changes as one's thoughts change" (Arnheim, 1962). Picasso even had the foresight to record through photographs his sequential sketches before completing this mural. He thought there might be a use for the process information that is so often overlooked when only considering the final product of design.

The design process as a system is not static, but is constantly evolving and changing as the designer's thought process and actions in the environment evolve and change. The environment is then, in turn, evolving and changing as a result of those actions. The Evolving Systems Approach (Wallace & Gruber, 1989) to design process aims to illuminate aspects of the creative process, and explore the subject by the description and analysis of creative work and its relationship to the environment. This approach views creative process as something unique and unrepeatable, and considers the interplay of purpose, play, and chance with a focus on the creative person as a complex and organized "evolving system in an evolving milieu."

2.4 The Design Process: Current Research Methods

One of the most influential researchers in the design field is Herbert Simon due to his de-

velopment and use of a research method known as “Protocol Analysis” (Simon & Newell, 1972). Protocol Analysis, or the “think aloud” method, developed by Newell and Simon, has continued to be an important research method still in use in current design process research. Essentially, designers are asked to constantly describe what they are thinking and how they are designing during their design process. If a participant fails to speak during the experiment they will be reminded to continue to do so by the facilitators. Most design process researches (Cross, 1996 & 1997; Dorst, 1996; Akin, 2004; Goldschmidt, 1996, 2001 & 2006; Visser, 1996; Jin & Chusilp, 2006; Schön, 1983) still utilize this method in their design research. Recently, however, some researchers have begun to question the ability of the designer to perform a design activity and verbalization simultaneously (Lloyd, et al, 1996). Some current research has chosen to exclude the use of Protocol Analysis during the design process due to its disadvantage of cognitive interference in favor of retrospective interviews, which has proven to be a reliable method (Hasirci & Demirkan, 2007).

In the study of design process, some design research takes place in the designer’s industrial or company setting (Ewenstein & Whyte, 2009), studying the an existing project in which the designer is currently engaged, while other designers are asked to engage in tasks specifically designed experiment for the purpose of the research (Schön, 1983; Cross et al, 1996), which usually takes place in a setting other than the designer’s place of work.

Design process research usually consists of video and audio recording of the design process, and may also include observation and note taking on the part of the researcher (Cross et al, 1996). Any drawings or notes created by the designer during the design process are also considered to be important supplementary data to the design process. Methods of analysis differ drastically depending on what specific phenomenon the researcher is attempting to study (e.g. the

design problem itself, design decisions, team designing dynamics, design strategies, etc.).

Most examples of design process research has been gathered from the architectural or industrial design fields. There is very little research to no research in the field of apparel design pertaining to the design process. There is some evidence of creativity research in apparel design (Kidd & Workman, 1999), but this is pertaining to the evaluation of the product only, and does not include the designer's process.

Research in the field of fine arts has also provided excellent examples of research methods in observation of the artistic process, and has provided alternatives to the primary use of Protocol Analysis in the design field. A video recorded field experiment of a Chinese ink painter (Yokochi & Okada, 2005) provided an appropriate model to follow in my own research. The researchers began the experiment by creating lines on paper that the artist would then use as a starting point for his drawings, and then observed his actions during the creation of the drawing, including periods where he would step back to observe his own work.

2.5 Objectives of this Study

The purpose of this research is to utilize methods of observation and verbal accounts collected through retrospective interviews in an effort to better understand the design process, specifically, how designers are forming ideas and how those ideas develop and change over-time during the design process. I am looking to record, in accurate detail, a step-by-step design process forwardly progressing in time, and to analyze that process both forwardly and retrospectively as it is linked to the product. The relationship of design elements and principles will also be considered as factors in the design process. This study will specifically focus on a designer's use of a draping process, but may also include sketches as supplementary data.

Chapter 3

METHODS

3.1 Appropriateness of Case Study Method for Design Research

Sometimes in science it is useful to isolate one part of a system in order to gain understanding about a particular function of that system, but any one part of a system cannot easily be untangled from the system as a whole, and any one part of a system left in isolation cannot survive and will cease to function as a part of that system. Since this research considers the individual designer, design process, the designed product, and the environment as a system, it was deemed necessary to follow case study methodology. Wallace (1989) defines the purpose of a case study as being: The observation of one individual and their diverse aspects of life and work, an attempt toward understanding that person as a whole, understanding the development of creative work, and the purpose of elaborating a psychological theory of creative work.

Case study method is not one, but a combination of methods. It is "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2009). The need for case study method arises out of the "desire to understand complex social phenomena" and "holistic and meaningful characteristics of real-life events" (Yin, 2009). A holistic, or systems approach (Von Bertalanffy, 1950), to design research will take into consideration not only the focus of the research, which in this case is the design process, but also its contextual factors such as aspects of the designer's background and education, the final products relationship to the process, and the physical and cultural environment in which the phenomenon exits. It

is important to acknowledge that each case is viewed as an individual phenomenon with a unique set of contextual factors, and does not represent a sample. Although the hope is to eventually draw some correlations among case studies, they must first be viewed as individual studies with individual contextual factors distinctive to each.

Case study method is the most appropriate method for this research primarily due to the nature of complexity in design (Simon, 1996) and the aim to understand those complex relationships through a holistic understanding of the phenomena. Case studies are appropriate in illuminating "a decision or a set of decisions: why they were taken, how they were implemented, and with what result." (Schramm, as quoted in Yin, 2009). In this research I focused on the decisions related to the translation and development of design ideas, as well as the progression of the design. When an apparel designer who is draping creates a change to the fabric on a form it is in effect a design decision, which will alter the direction of the current design by "nipping in the bud" (Von Bertalanffy, 1950) alternative paths and shaping the course of future design decisions.

Other research methods would not be suitable for this investigation due to their lack of holistic aim; however, it became necessary to exert a small level of control over some of the variables, resulting in quasi-experimental case studies. A purely experimental method would also strive to reduce variables, which is helpful in the reduction of complexity, but would also serve to divorce the phenomenon from its context (Yin, 2009) and provide a narrowed and incomplete view of the topic. Quantitative methods of analyzing data are not useful as a primary data source due to the limited number of participants, but can be used to supplement other analyses, such is the case of calculating percentages of Action Types engaged in by the participants. If there were a larger number of participants to draw from, quantitative methods could be applied more appropriately to draw further cross-comparisons between studies.

3.2 Case Study Selection Criteria

The unit of analysis for this research is the individual, specifically, the individual engaged in a design process. The selection criteria for the study participants are first based on the designer's use of draping in their design process. Use of the draping method as a starting point for selection will eliminate many individuals. The most widely used design method in the fashion industry is sketching, and most manufacturers involved in mass production prefer this method due to its efficiency. It is faster and more cost effective than draping, which requires much more of the designer's time and more fabric resources. CAD sketching is widely used for mass-market manufacturers for its ease in the adaptation of existing designs. Participants were not selected based on gender or age, however, I acknowledge that these contextual factors may have bearing on the design process and resulting product. I required that each of the designers have at least 5 years professional industry experience, the minimum requirement for consideration as an "expert" in the design field according to Omer Akin (2004). It was also a requirement that the designers were college educated in fashion design with a minimum requirement of a bachelor's degree, and that they took draping courses during their undergraduate studies. I did not select participants based on the university, but I will acknowledge that differences in education and teaching of design methods may have an effect of the design process and resulting design product. For this research I have included a total of six designers and their accompanying processes.

3.3 Data

The purpose of this research is to understand the designer's process through a semi-controlled quasi-experimental study. Observation and verbal data from interviews are the primary

source of data. I believe there is much indication that the use of Protocol Analysis interferes with the other cognitive processes required of the designer during a design process, and for this reason, I am choosing to use observation and retrospective verbal accounts as the primary data sources. I did not follow Protocol Analysis as described by Simon and Newell (1972) by using verbal data generated by study participants as they engage in the design process as the primary source due to the previously mentioned conflict of the brain's limited processing capability. It is not thought to be possible for the brain to perform more than one function at the same time. In this case, the designer would need to interrupt their own thinking and designing processes in order to translate them to words in an attempt to describe what they are thinking and doing. They would have to think about thinking, and as I have also already described, only those thought processes that are available to our consciousness would be available to rationally think with. Non-conscious processes, or knowing about something, would not be available, and thus could not be described as these processes are intuitive and not readily available to the conscious mind. In addition, a fellow graduate student and myself experimented with using this method in the pilot stages of this research, and found it to not be as suitable as observation. In my belief, observation is critical to understanding of design process, but it is difficult for many reasons. Most significantly, we cannot see everything that is happening during the design process. There is a great deal of information processing going on inside the designer's mind that must be inferred through the designers actions and retrospective verbal accounts.

Chapter 4

PROCEDURES

4.1 Pilot Studies

A great deal of time and thought went into the creation of the design environment for observation and collection of case study data. Two pilot studies were conducted to test possible research methods in collaboration with another Cornell graduate student in apparel design, as both of us have backgrounds in fashion design. For the first pilot study, we individually selected a source of inspiration, selected fabrics, and began a draping process using the Protocol Analysis method to record our thought processes. This attempt was brief as I became frustrated and distracted by the attempts to verbalize thought while designing. As a result for my study, I chose to let the participants decide for themselves if and when they would like to speak during the process. I found that I was able to speak during moments when I was evaluating a decision that I had just tested. For instance, I could easily state my like or dislike, or question the cohesiveness of a new part I had created in the design. How that decision came to be, or where the new part originated from was more difficult to describe. It seems obvious to me that if the design process was easy to explain, everyone would already understand how to design, and there would be no need for this research. The design process is a much more complex and multi-faceted process than can simply be described in words, and in my opinion, our language is insufficient. Words have developed as an effective way to communicate, but sometimes there are no words to describe something accurately. Or more specifically, sometimes we are unaware of what we are thinking, and therefore can make no words with which to describe our mental processes. For

these reasons, I chose observation and verbal data (collected from interviews or during the design process) as the primary method of data collection.

4.2 Equipment Used to Collect Data

One of the biggest obstacles for the study was the development of equipment to use for data collection. It was important to capture, with as much detail as possible, every movement of the designer so that the crucial actions would not be missed. The most ideal equipment for this would be a high-resolution digital video camera. I tested three different video cameras in pilot tests to which I had access, all of which were found to be insufficient both in the length of recording as well as the quality of the picture. When the designers would work on a small detail of a garment it would be nearly impossible to see from the video exactly what they were doing. I had hoped to allow the designer to work in a room by his or herself and without any others present, but this turned out to be impossible. I experimented with setting the video camera up in many places in the room, and from many angles, but inevitably, the designer would end up standing in between the dress form and the camera. Even when asked to be aware of the camera, the designer would forget. Of course, this request is too cumbersome to the designer when their main concern should be the design they are working on, not the location of the camera. After the video trials I knew I would need to be in the room with the designer to record the process, although I disliked this idea because of the potential to interfere with the design process. I also offered an MP3 player to designers to listen to music and to create a sound barrier between us, but they usually either did not want to use it or wanted to use their own. Most designers just chose to ignore me, and some used headphones and listened to their own MP3 player. However, one designer (A) tried to include me multiple times in their process by asking my opinion on how to

proceed, which I chose not to give.

For the recording device, I used my own digital camera, a Nikon D60 in order to capture high quality images. The use of photography as opposed to video presented two main obstacles. The most obvious of which was the timing of the image capture. One option as to take the photographs in successive time intervals during each designer's process, and although this method provides a precise time line, it was not appropriate for my experiments because the main focus was on documenting changes, and a critical change could occur between the time increments and would not be captured. Without using a video camera or taking pictures at regular intervals I would sacrifice a precise timeline, but I could still capture the general sequence of events, which for these purposes was more important. I used my own judgment to determine when to take the pictures, but did not let more than a minute or two go by without taking one. I ended up taking hundreds of photos, sometimes as many as 800-900 photos per session. The other obstacle, which seemed to bother me more than the participants, was the flash of the camera. I tried to conduct as many experiments as possible during the daytime and with natural light, but the availability of the designers often made evening participation sessions more desirable. I did provide additional artificial light for the design space, but it was often still not enough and a flash had to be used. In such a case, I asked the designers about their comfort level, all of which said they were not bothered by the flash, so we proceeded using the flash. Other equipment, which did not provide many obstacles, included digital sound recording, along with all of the tools and materials needed to design.

4.3 Determination of the Design Task Presented to Participant Designers

As the obstacles with the equipment were being solved, I was also determining how the

case study would be conducted, and what I would ask the designers to do. Since the focus of this study was to track the changes in the 3D structural aspects of a garment, I decided to use draping as the method of design development. It was necessary to limit some of the design variables in order to better understand others. For instance, the designers selected a source of inspiration image so that the ideas could be more easily traced from source to target, or final garment. If there was no inspiration image provided, the designers could potentially draw on inspiration derived from any number of sources, some of which may remain unknown to them, and therefore unable to be described. Although this occurred regardless, the provided source of inspiration gave a definitive starting point so that ideas could be identified and traced more easily.

Another important limitation was in the color and surface design of the available fabrics. I provided many different fabrics for the designers to choose from, included muslin. All the fabrics were as similar to naturally colored muslin as possible, but had different attributes such as drape, texture, etc. The fabrics were: muslin, cotton lace, silk jersey, silk chiffon, stretch silk suiting, cotton corduroy, and silk organza. I wanted to provide muslin fabric, which is usually used by designers in the draping process as a stand-in for a variety of other fabrics, but I did not want to limit them to only muslin in order to allow for variations in opacity, drape, and surface appearance if it was something they desired in their design. I purposely chose high quality materials that would be attractive to a designer. In my own experience during the trial runs, I did not want to use fabric if it felt 'cheap' even if I desired the characteristics of that particular fabric, so I kept this in mind when choosing fabrics to offer the designers.

The designers all had access to the same set of fabric choices, and they were all provided with the same dress form (size 8 Wolf brand) in each experiment as the starting point of the draped garment. As a designer myself, I was sensitive to the fact that someone could potentially

be inspired by anything, including their tools and surroundings. Ideally, all of these studies would have taken place in an empty room with only the equipment and tools needed for design, in order to limit the amount of extraneous visual information that could potentially provide the designers with inspiration.

In order to better understand how a design originated I thought it to be necessary to provide the designer with a source of inspiration, so that I could better trace the ideas from a specific source to the target, or draped garment. I provided the designer with a set of different sources of inspiration in the form of an 11”x17” printed collaged images. The process of narrowing down the selection of potential sources of inspiration was also carefully thought out and tested. I consulted with student designers as well as faculty members in the Apparel Design department at Cornell, and ended up choosing five sets of images (Images #1-5, which were all provided to each designer so that they may choose one as their source of inspiration for their garment design.

Image 1

Image 2

Image 3

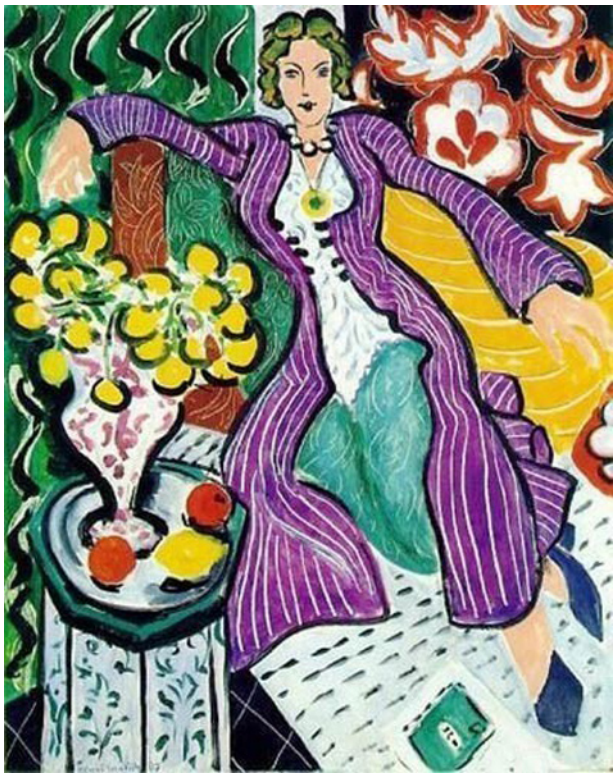


Image 4

Image 5

The first image is of an Egyptian chair from King Tutankhanmun's toumb and includes a second detailed photo (Image 1), the second image was photographs of the exterior photographs of Gaudi's Casa Batilo in Barcelona, Spain (Image 2), the third image contained exterior photographs of Notre Dame Cathedral in Paris, France (Image 3), the fourth image, a Matisse painting (Image 4), was chosen after receiving feedback from one of the faculty members that we should include a graphic-style image, and the fifth image provided was of Jacques-Louis David's Napoleon's Crossing of the Alps, the fifth version c.1804 (Image 5). This last image was chosen due to John Galliano's references of and continued fascination with of Napoleon (Horyn, 2005). Although specific sources of inspiration were provided, designers can be inspired by anything, including the past experiences of the designer. I attempted to distinguish design elements which came from external sources through the pre-design questionnaire as well as the post-design interview.

In choosing participants, designers were first chosen based on email or phone conversations in which they were asked about their background information relative to design experience. Suitable participants were required to have the minimum qualifications of at least five years of professional industry experience in apparel design and an educational background in apparel design. I attempted to find designers with a high level of expertise in their field, but I do not believe that expertise comes solely from a certain number of years of experience. Of course, I am not denying years of experience help to create design expertise, just that I doubt that it can be measured and determined in numbers of years. I believe instead that a designer with a high level of expertise will exhibit this understanding through their design process.

As most of my design participants do not live in the area it was difficult for them to take time off from their schedules to travel to the university where a neutral room was available. In

order to maximize the participation in this study, which was voluntary and unpaid, it became necessary for me to travel and meet designers at their convenience. While this did allow me to find more willing participants it also did not allow me to use the same location for each experiment. The different locations for the study could have potentially affected the experiences and outcomes of the different designers. Searching for an off campus location also provided some obstacles, but in the end I secured artist's studios in New York City for the weekend at a reasonable rate. These studios had white walls and less potential distractions than a decorated or furnished room. I traveled with the dress form, camera and audio recording devices, fabrics, and all other materials and tools provided in order to replicate the same scenario in a different location as closely as possible for each designer.

When I began the experimentation portion of this study, suitable participants were first asked to fill out a pre-design questionnaire with questions pertaining to their background in design so that I would be better able to understand their particular design perspective and possible previous influencing factors, such as a current collection or target market. I then asked each designer to select a single source of inspiration from the five provided. I did not want them to spend too much time contemplating the decision, so I asked that they choose as quickly as possible. Even so, many designers saw this an important decision and had some trouble quickly narrowing down the five choices to just one.

Designers often refer to two main sources of inspiration in a draping process: One is inspiration derived from fabric, the other is inspiration from another source, such as the visual source of inspiration provided. These two inspiration sources, although different, are often tandem and somewhat difficult to distinguish from one another in the design process. In this particular research, the designer was given a visual source of inspiration in the form of images from

which to be inspired, and then given a choice of fabric from a limited selection. Some designers made this fabric choice after the garment had already been conceptualized during an optional sketching session. However, this is not to say that the fabric did not play a role in the inspiration. Even if a designer perceives certain information from the image and then selects the fabrics, they may derive additional inspiration during the draping process based on how the fabrics are reaction to their manipulations on the form. In my own design experience, both of these types of inspiration, fabric or imagery, are important to how the design is developing.

Aristotle said that we cannot think without images. When I begin to design I either form mental pictures of a possible garment, or part of a garment, complete with a type of fabric that would be needed to construct the design, then visit a fabric store in order to find a particular fabric I have in mind, or I wander the fabric store and become inspired by a certain design based on the fabrics that attract my attention. Both ways of designing have been important in my own experience, and are never two separate processes. Often I find it more difficult to search for a particular fabric rather than let the fabrics speak to me of their possibilities. If I go in search of a particular fabric, I often find another fabric I had not thought of previously but could incorporate in the design, therefore changing the initial design ideas. In my own design experience, I have never been able to think of a detailed design, find the exact fabric I imagined, and create it as if my first design idea materialized from my mind. As systems theory suggests, many factors, including feedback from the environment, could potentially influence the direction of my design. To design is to see possibilities that do not yet exist, and a designer may not be seeing the world as it is, but how it could be.

4.4 Pre-Design Questionnaire

Before they engaged in the design process, I asked the participants to complete the pre-design questionnaire to gather relevant background information including their education, industry experience, and general questions pertaining to their understanding of their own design process. The complete questionnaires can be viewed in Appendix A.

4.5 Design Draping Process

The participant was then asked to select a source of inspiration, and allotted four hours in which to drape a women's garment using the source of inspiration as a starting point, but was allowed stop at any point prior to the time limit if they felt as though they were finished. The draping session was photographed and audio taped. However, not all design participants followed this same path, some of the designers chose to participate in a tandem research project related to sketching. If this was the case, the designer first selected a source of inspiration from the five provided, and then sketched a collection of at least five garments to form a collection. They then participated in the draping session and had the choice to either use one of their previously created sketches as the basis for the draped design, or create a new design for the draping session. These participants chose from the fabric selections provided and proceeded with their draping process.

4.6 Post-Design Interview

After the completion of the pre-design questionnaire, sketching and draping processes, all six designers were asked to participate in an approximately 30 minute tape-recorded, semi-structured post-design interview to clarify and question the designer's intentions at various stages during their process, as well as to review why a particular source of inspiration was chosen, and what initial ideas were borrowed from the source. This interview was a guided discussion

enabling the designer to explain their process retrospectively without needing to disrupt the design process. This interview was semi-structured in nature, to allow for the conversation to be primarily guided by the designer's comments. Designers were asked to explain their design process, critical steps or decisions along the way, as well as their own critical evaluation of their design process both in industry and in this study. There were certain questions that were asked to all designers, for example, those pertaining to the designer's initial inspiration from the selected source of inspiration, but in general question were open-ended and each designer was given the freedom to lead the conversation in a direction of their choosing. Topics for the interview discussions focused on, but were not limited to, design methods currently used in industry practice, typical sources of inspiration for industry practice, design ideas derived from the provided sources of inspiration, critical design decisions during the draping process, design elements and principles, the origination and development of design ideas and their resulting translation, as well as their own evaluation of the finished garment. As design is primarily a visual process, I understand that many of the questions I asked the designers would be difficult to answer, or their answers may be incomplete or insufficient. I am asking the designers to translate a visual process into a verbal explanation, and also asking them to explain consciously a mental process that is only partly available to their conscious, the other part being an unconscious process.

I transcribed all of these interviews, which gave me a chance to revisit each designer's description of his or her process, as well as categorize discussion topics. The transcriptions captured every word, but in reporting the results I have edited the quotations from the original transcription, eliminating terms such as "like," "um," etc. I was careful not to alter the content in any way, aiming only to improve the reader's understanding of the statement. Below I have provided an example of an original quote, and then the edited quote:

Original quote (designer F):

"Yeah, a theme that I can, not quote-unquote "relate to," but one that I'm comfortable with working with or mimicking, or using as inspiration. As far as the reason I didn't pick the buildings in Spain, or wherever, or the other two paintings is because I really didn't relate to them. And there's just so much Egyptian culture that you hear about, or history, or you become really familiar with the costuming or cultural wear or whatever you want to call it, so I felt like I could interpret that easier than any of the other ideas" (Audio file 2, 3:14-4:21).

Edited quote (designer F):

"A theme [is something] that I can relate to, I'm comfortable working with, mimicking, or using as inspiration. There's so much in Egyptian culture and history. You become really familiar with the costuming or cultural wear. I felt like I could interpret that easier than any of the other ideas" (Audio file 2.2, 3:14-4:21).

Chapter 5

DESIGN DRAPING PROCESS FINDINGS

5.1 Introduction

In the determination of how the structure of a garment is changing, I am primarily concerned with the 1D element of point, the 2D element of line and the 3D element of space. Line can be created by the surface of the fabric, or it can be created with structural aspects of seaming, pleating, gathering, etc. Space is created in terms of positive and negative spaces on the body, and volume away from or toward the body. Sometimes a change in one dimension also creates a change in another dimension. Due to this interconnectedness, the 'web' of design process cannot easily be untangled. What I have learned, and hope to illustrate in this research is that design is a process of unfolding. Each part is born from the previous parts, and gives the designer new information with which to proceed forward. And, as an observation of process, it would be impossible to understand how the changes in 1D, 2D, and 3D relate to one another without the 4D aspect of time. These case studies are an examination of sequential events that are manipulated in the previous three dimensions and take place over time. The context of time is not as important here in terms of regular intervals determined by number of minutes or seconds as it is in terms of instances of change in the designed environment. The goal of this research was to record the any and all visible change to the garment, or action by the designer in as much detail as possible. The findings for each of the six designers are divided into several sections in accordance with their particular design process. This section is intended to give the reader a broad overview of each designer's process, and will be discussed in greater detail in the

chapter titled Discussion. All designers were asked to complete a pre-design questionnaire prior to beginning their design process. The information from this document was typed verbatim into a table in the first section, titled Pre-Design Questionnaire, in order to be viewed as an introduction to each designer.

The next section consists of the design process, which is sub-divided into three or more sections, depending on each particular designer. Each design process begins with the Inspiration section, which features the source of inspiration image chosen by the designer and may include an accompanying quote related to the significance of why this image was chosen. The Translation section highlights specific design elements that were stated by the designer as being directly borrowed from the source of inspiration and shows how those design elements have translated into the design of the draped garment. Each highlighted element is accompanied by a quote from the designer pertaining to the design elements that were stated as being borrowed from the source of inspiration. Some designers chose to participate in a tandem research project focused on the sketching process of designers where they were asked to sketch a collection of at least five garments. If this was the case, or if the designer voluntarily chose to sketch before the draping process, a Sketching section has been included. If the designer completed a collection only their final sketches chosen for the collection have been included and are numbered in sequential order. If the designer did not complete a collection, but chose to sketch voluntarily as a part of the draping process, then any croquis sketches completed prior to beginning the draping process have been included.

The next section, Draping, was completed by all designers and documented through photographs taken during the design process. Photographs were taken at any point of change to the fabric, whether on or off the form, or observation by the designer of their own work. Although

hundred of photos were taken for each process, the photos shown in this section were chosen because they were determined to show a critical change in the draping design process. These changes have been selected and numbered in sequential order. Although taken in color, each photograph is shown in black and white in an effort to focus on the designer's structural and surface manipulation of the fabric on the form. The provided fabrics were also chosen by their constraint of color, as each of them were off-white. When appropriate, each photograph features an overlay line drawing for the purpose of illustrating the action being performed in that image by the designer. Each photograph also includes a table categorized in four ways. The first, Action, explains what action the designer in the accompanying photograph is performing. The second, Area, explains the area of the body form in which the designer is performing the action. The third, Type, indicates which of the four types of actions are being performed (decision, idea testing, evaluation, tuning). The author created these four action types after the completion of all six of the design process observations in an effort to more fully explain what was observed in the design process. Patterns of actions emerged and resulted in the creation of these four action types, but could only be observed after the completion of each design process. So, the critical changes are shown in a forward progression from beginning to end, but the action types, along with the other categories in each table, were determined starting with the end product and working in a backward progression. Since there is very little current research pertaining to design process analysis, these methods were created by the author. The action type 'decision' is highlighted when appropriate so that the critical decisions, determined from the final product and which lead in progression to the final product, can be more easily identified. The action type 'idea testing' signifies actions that the designer performs to test out possible design paths, but does not necessarily follow in that direction. The action type 'evaluation' refers to when the designer is visably

evaluating their own work, usually by taking a step back to see the work in progress as a whole. The last action type, 'tuning' refers to when the designer is making minor adjustments to the draped garment, such as slightly moving a seamline or the placement of a detail. Tuning is more of an elaboration on a previous decision, rather than a new idea. The fourth category, Effect, summarizes what effect the action has on the progressing design. This category traces how ideas evolve and changed throughout the process based on predominate design elements and principles at play.

5.2 Design Participant A

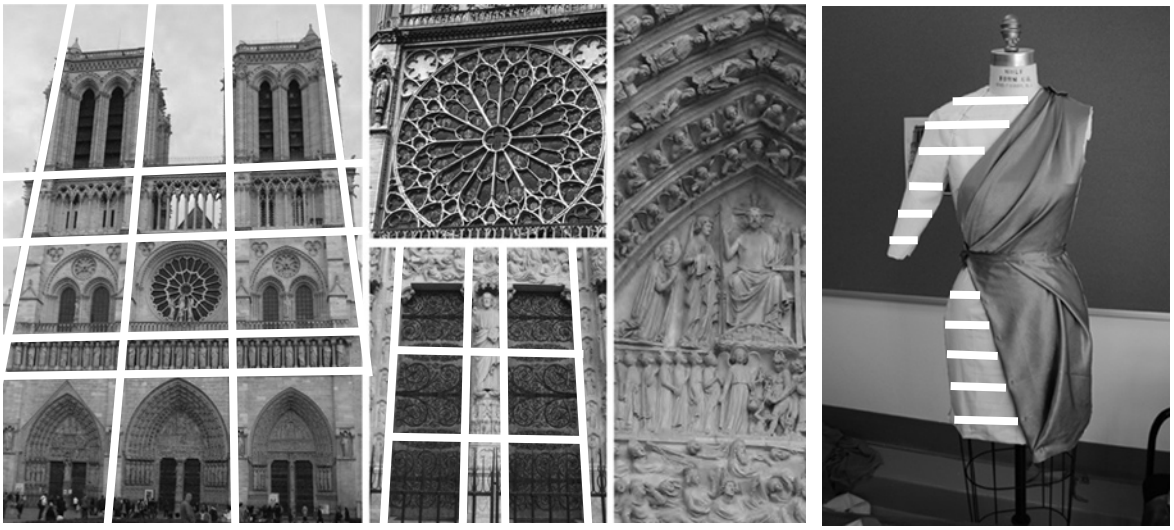
5.21 Design Process: Source of Inspiration

"Every time I looked back I saw something else that I could use, like the belt. I started with the lace, as soon as I saw [the inspiration]. I thought of lace and horizontal stripping and draping. That's where it began. I don't design a lot without the fabric, so I kept trying to look back for something different."
(Audio file 1.1, 33:58-35:10)

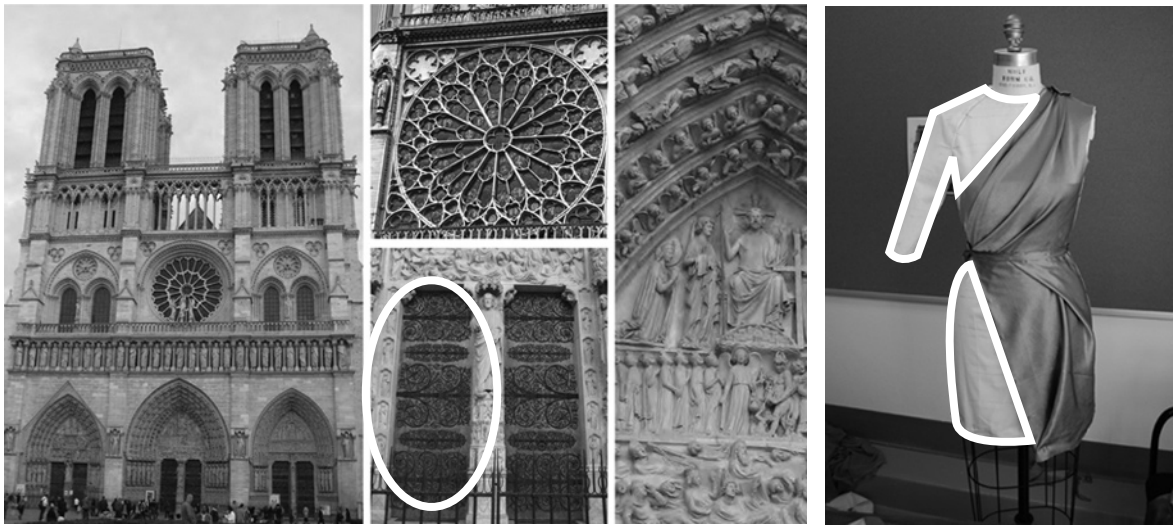
"[The inspiration] is an idea... and what that represents."
(Audio file 1.2, 4:25-5:13)

"…you could just take anything. If I wanted to use it as a print, I could use it as a print. It has a contemporary theme."
(Audio file 1.2, 16:18-20:00)

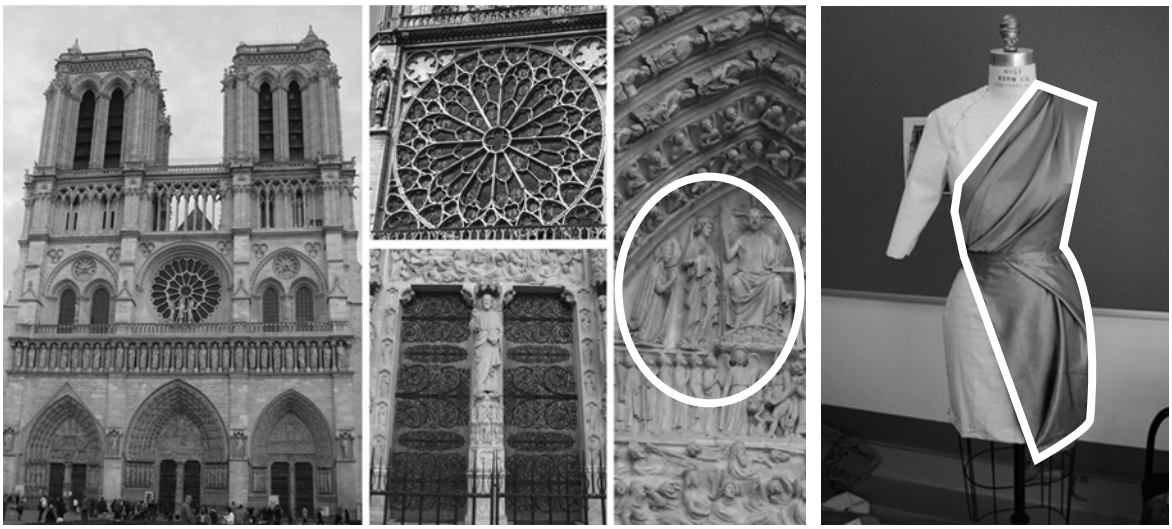
5.22 Design Process: Translation



"I started thinking, I'm not just going to take these exact elements, but I'm going to break it up the way I see it if I was to put it into a computer and change the contrast...so it was very gridular to me… And also this repetitive thing…"
(Audio file 1.1, 0:00-1:40)

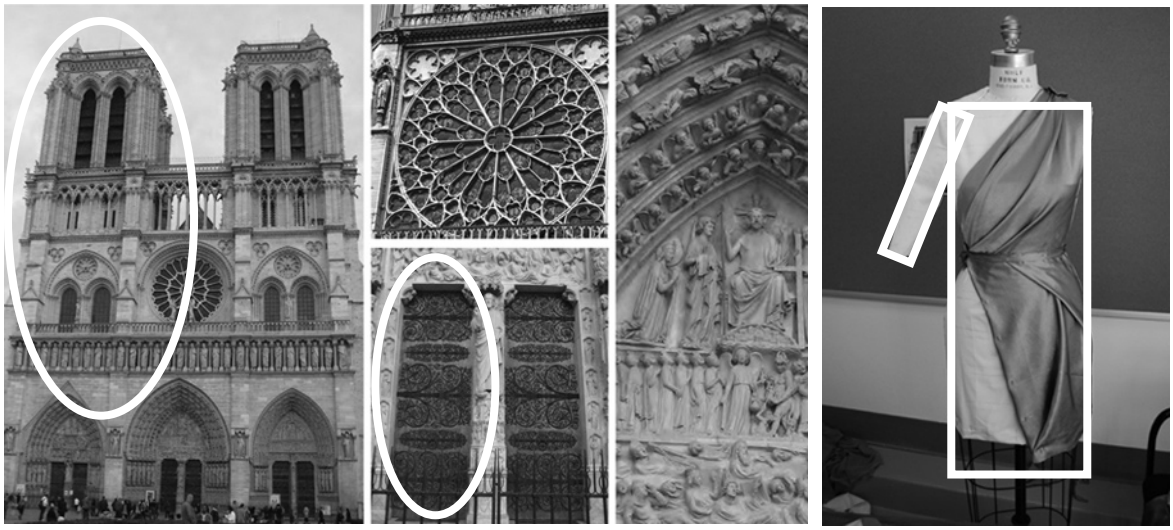


"…and at the same time between the grids it had this beautiful motif...for me it immediately translated into a lace.
(Audio file 1.1, 0:00-1:18)



"I personally like asymmetry, and I was looking at the clothes of the monks, and they were just draped in ways that make them very asymmetrical... I tried to break it up and cut it up a little bit."
(Audio file 1.1, 5:24-6:20)

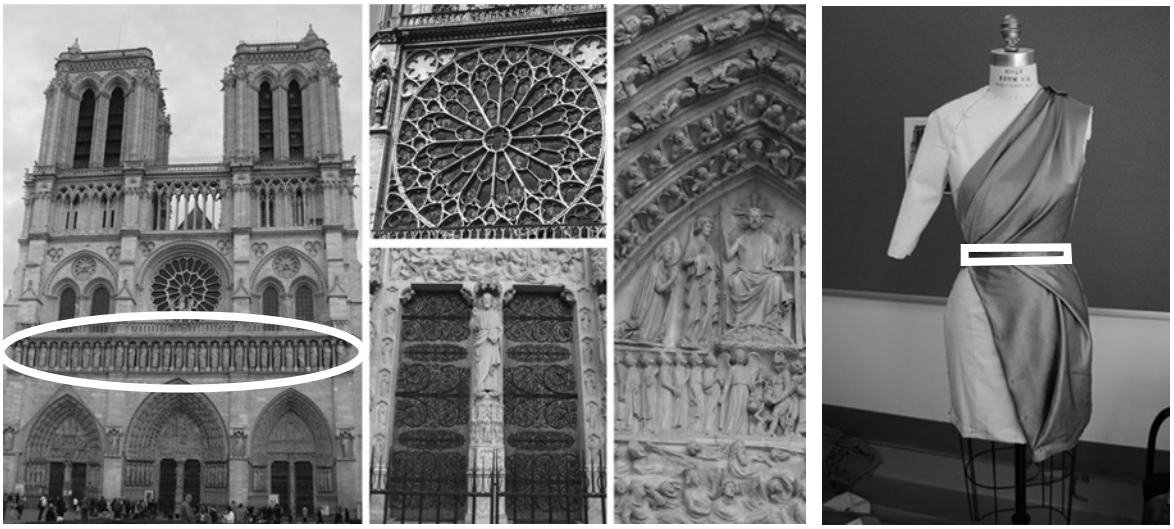
This is a really important feature here. Everybody is wearing drape..."
(Audio file 1.1, 24:53-25:49)



"...what if we made a sheath dress and use the idea of the bell tower?"
(Audio file 1.1, 26:26-26:48)

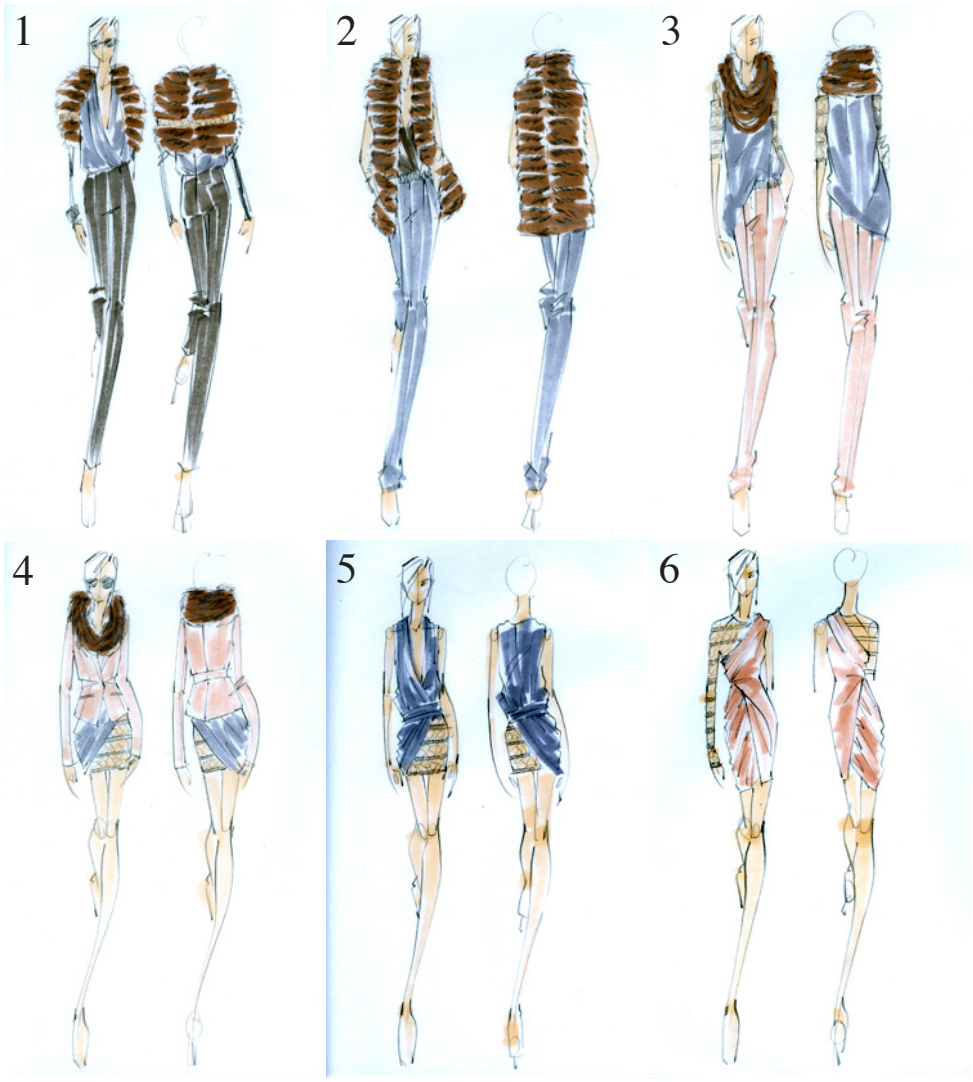
"I think the whole thing is very rectangular."
(Audio file 1.1, 29:35-30:07)

"I was looking at this circular shape in the middle, so I didn't want to leave that out since it was the first thing you see…. "
(Audio file 1.1, 6:59-7:36)



"I saw this and thought, what a cool belt. If it was little icons, like statuettes or something, as a belt! It would be really cool."
(Audio file 1.1, 29:09-29:35)

5.23 Design Process: Sketching



5.24 Design Process: Draping

This designer chose the between-domain image of Notre Dame, as the inspiration for his design process. He participated in the sketching session, resulting in a total of six full figure croquis, and then selected one of those six (#6 from the sketching croquis) to use as a starting point for the draping process.

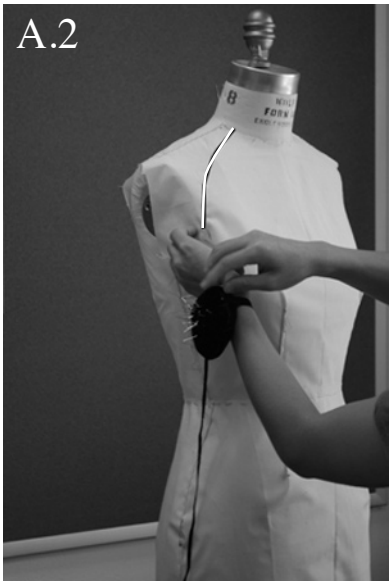
"I was thinking about the girl: where she's going, what she's wearing, and where she is wearing it to…. and then I took a look at the inspiration that was given to me which was Notre Dame. I extracted details from there and put them into shapes and silhouettes that I thought would be flattering for the girl. Then, I went through a series of croquis sketching, thinking of how to work the details and silhouettes, and then based on those sketches came the draping."
(Audio file 1.2, 2:15-3:39)

"It's really difficult to focus on this specific inspiration because I might just do a fabric manipulation that might just become the new detail which I would never have an opportunity to experiment with, but if I did then that could have brought me completely somewhere else, and I might be inspired by something else in addition to the original source of inspiration. So, anything can happen."
(Audi file 1.2, 5:18-6:15)

A.1

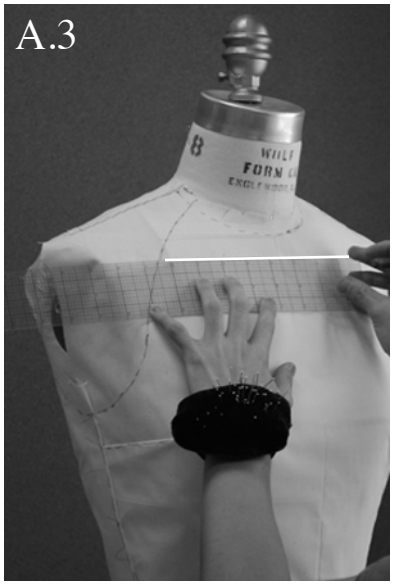
Action	creation of sheath dress
Area	entire body form
Type	decision
Effect	creates base of dress

A.2



Action	taping
Area	from neck to right shoulder
Type	decision
Effect	creates raglan seamline

A.3

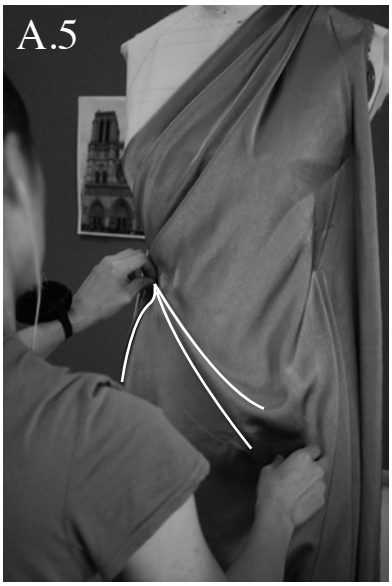


Action	tracing lines
Area	front bodice
Type	decision
Effect	creates horizontal seam-lines for lace strips

A.4

Action	new fabric layer (satin)
Area	from left shoulder to right waistline
Type	decision
Effect	contrast of fabrics and surface structure

A.5



Action	gathers
Area	from right waistline toward left hip
Type	idea testing
Effect	contrast diagonal gathers from bodice section

A.6

Action	cutting
Area	waistline
Type	decision
Effect	creates waistline seam, fabric is more fitted to waist

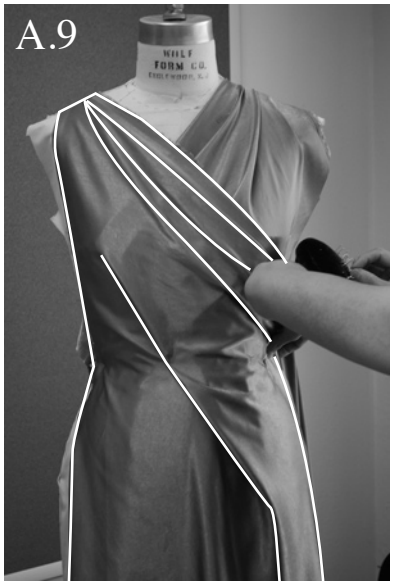
A.7

Action	adjusting number of gathers
Area	front bodice
Type	tuning
Effect	increase in number of gathers

A.8

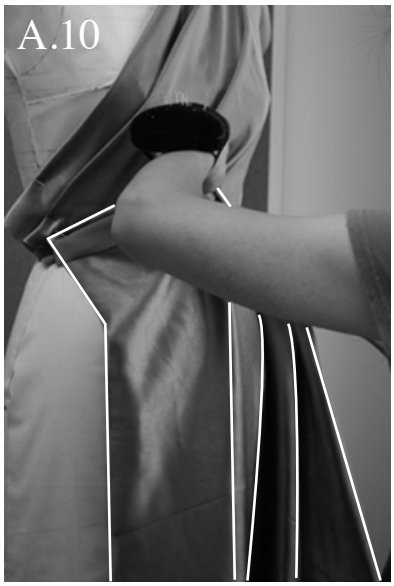
Action	new fabric layer (satin)
Area	from right waist to left hip
Type	idea testing
Effect	contrasting diagonals

A.9



Action	fabric moved from waist
Area	from left shoulder to right hip
Type	idea testing
Effect	allows gathers to originate from the shoulder

A.10



Action	cutting
Area	waistline
Type	decision #9 altered
Effect	asymmetry top and bottom, contrast of diagonal gathers

A.11

Action	pinning
Area	right hip
Type	tuning
Effect	adjustment of gathers

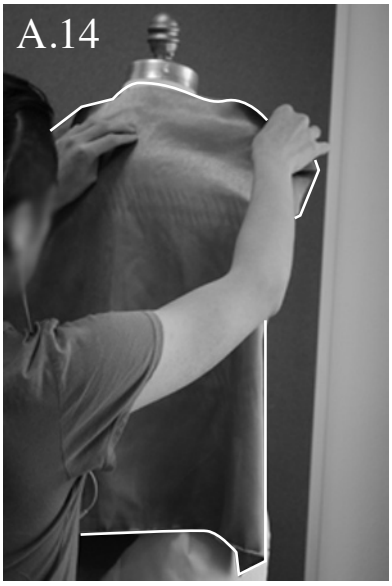
A.12

Action	cutting
Area	hemline
Type	decision
Effect	creates hemline

A.13

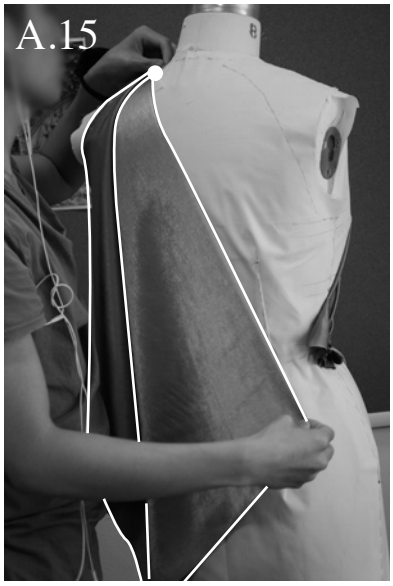
Action	pinning
Area	front skirt hem
Type	tuning
Effect	adjusting angle of gathers

A.14



Action	new fabric layer (satin)
Area	from shoulders to waist
Type	decision
Effect	creates back bodice section

A.15



Action	gathering
Area	back left shoulder
Type	decision
Effect	continues gathers from front bodice

A.16

Action	pinning
Area	left SS
Type	decision
Effect	creates front to back symmetry on bodice

A.17

Action	adjusting gathers
Area	back left shoulder
Type	tuning
Effect	adjusting diagonal lines on back bodice

A.18

Action	cutting
Area	back waist
Type	decision
Effect	creates back waistline, same as front (#6)

A.19

Action	new fabric layer (satin)
Area	back waist to hemline
Type	decision
Effect	continues skirt portion to back of form

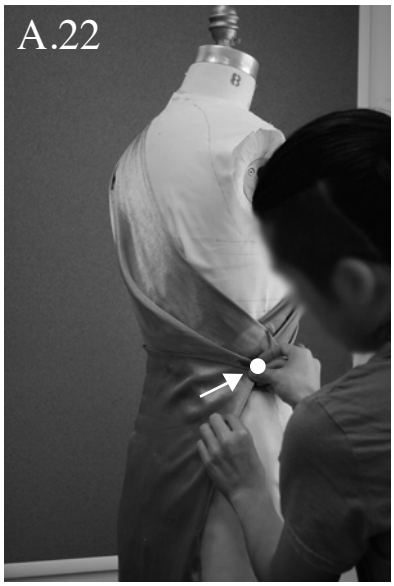
A.20

Action	pinning
Area	left SS
Type	decision
Effect	creates left SS on skirt portion

A.21

Action	dart
Area	left side, from waistline
Type	decision
Effect	gathered front of skirt portion is contrasted by fitted/flat back portion

A.22



Action	pinning
Area	left SS
Type	tuning
Effect	adjustment of SS with front and back skirt

A.23

Action	gathering new fabric layer (chiffon)
Area	from left shoulder
Type	idea testing
Effect	contrast in fabric and size of gathers (smaller)

A.24

Action	drawing horizontal lines
Area	right hip
Type	decision
Effect	horizontal lines indicate lace strip seam lines

Action	gathering chiffon
Area	from left shoulder to right hip
Type	decison
Effect	contrast of opacity and layers

Action	gathering and pinning chiffon
Area	right hip
Type	decision
Effect	continuation of gathers

Action	continuing to gather and pin chiffon
Area	right hip
Type	decision
Effect	continuation of gathers

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

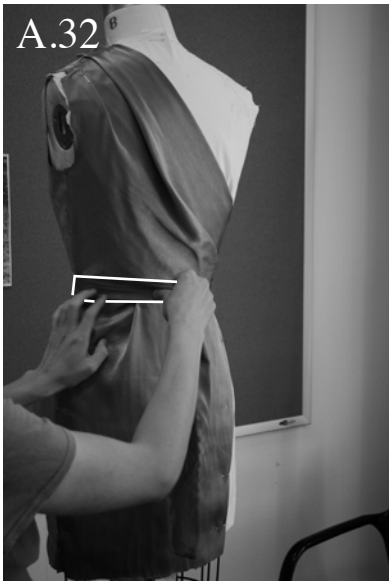
Action	cutting chiffon
Area	right hip
Type	decision
Effect	removal of chiffon in bodice area

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

A.31

Action	removal of chiffon fabric, defining horizontal seams
Area	right hip
Type	decision
Effect	eliminating #23-30

A.32

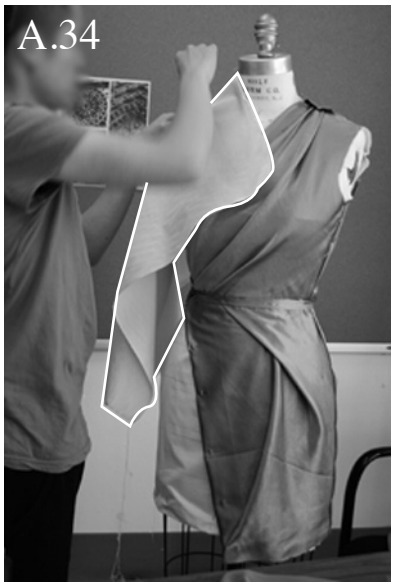


Action	addition of belt
Area	over waistline seam
Type	decision
Effect	accentuates waist, repeats horizontal line

A.33

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

A.34

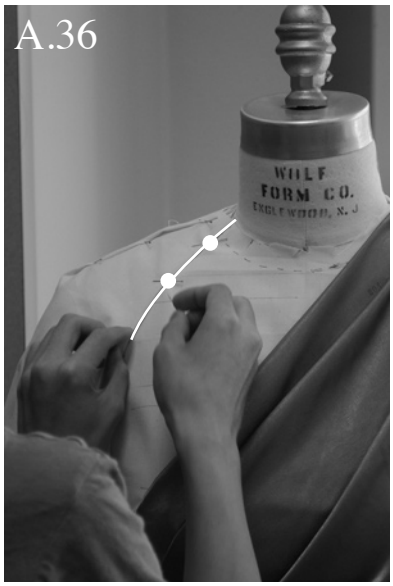


Action	new fabric layer (muslin)
Area	from right shoulder
Type	decision
Effect	begins to create right sleeve

A.35

Action	dart
Area	right shoulder
Type	decision
Effect	allows for the construction of raglan sleeve

A.36

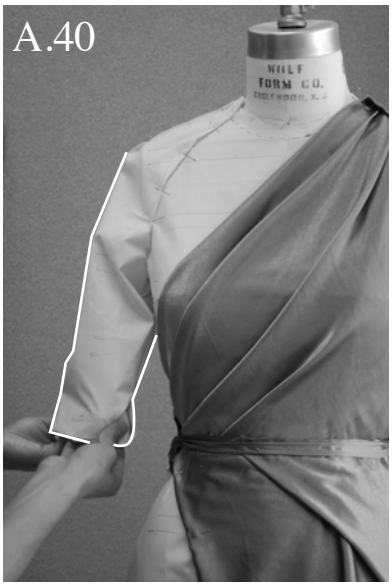


Action	pinning
Area	right shoulder
Type	decision
Effect	creates seamline for raglan sleeve

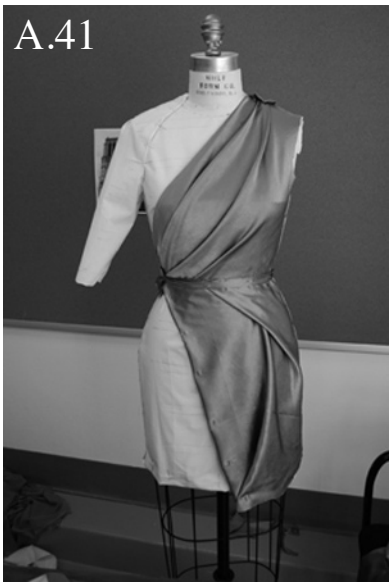
Action	continuing to pin
Area	right armscye
Type	decision
Effect	creates raglan sleeve armhole

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

Action	cutting sleeve
Area	right sleeve
Type	decision
Effect	shortens sleeve length



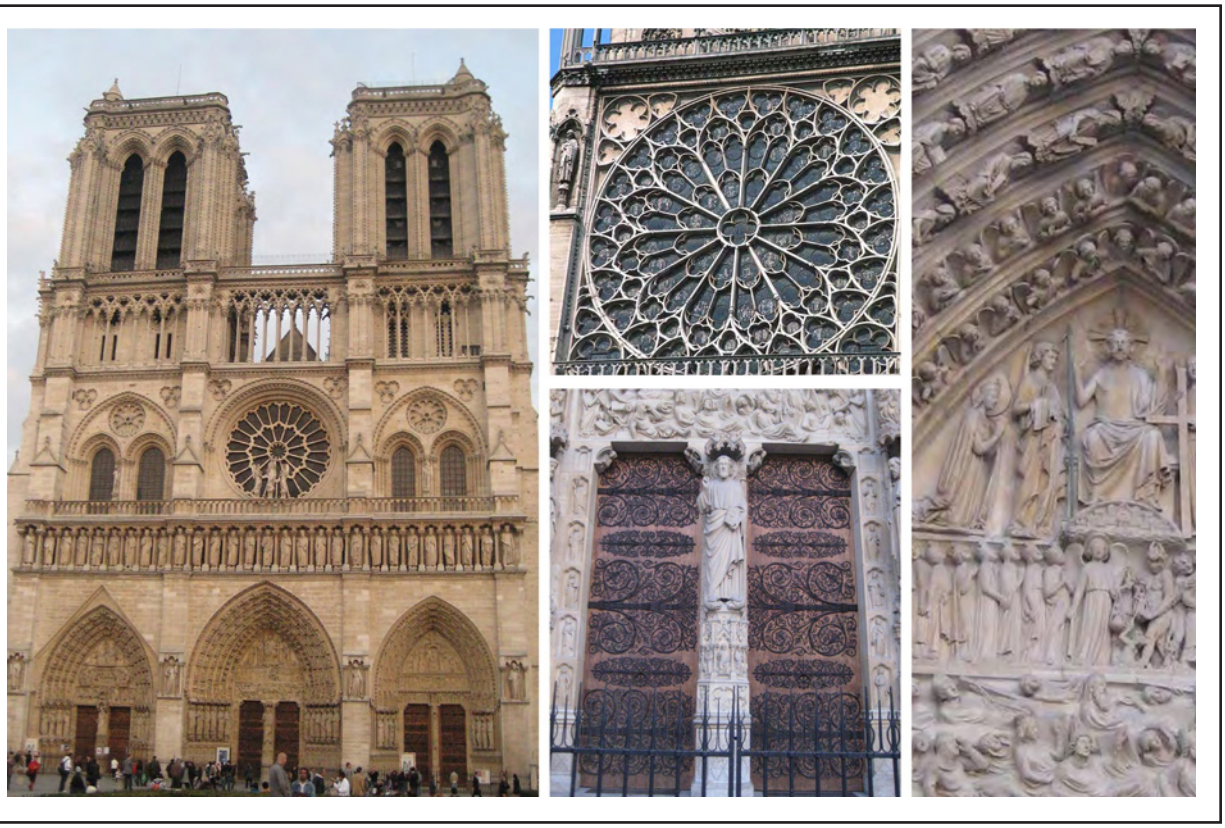
Action	adjusting sleeve
Area	right sleeve
Type	tuning
Effect	small decrease in sleeve length



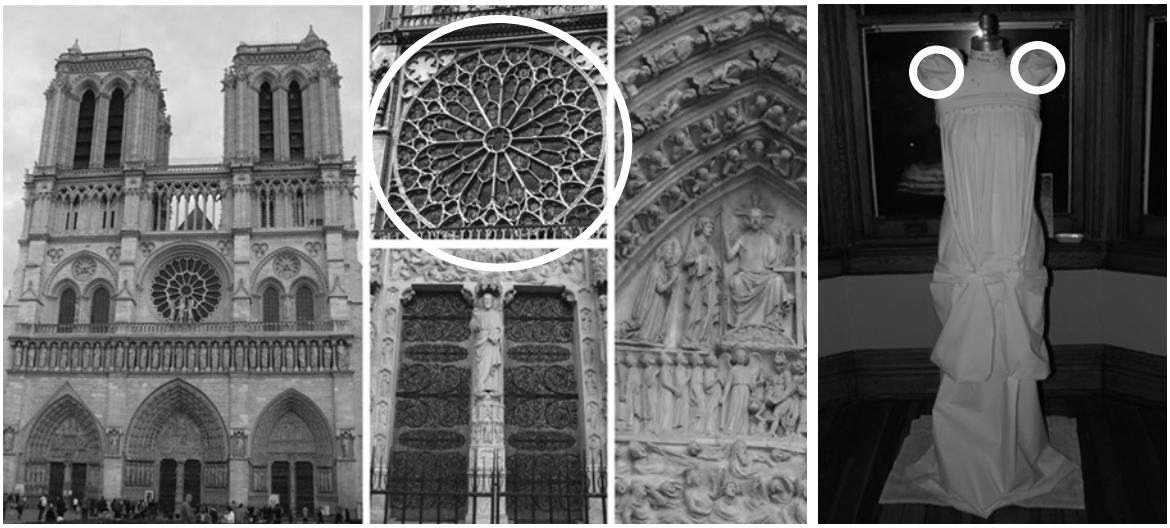
Front view of garment at the end of the draping session

5.3 Design Participant B

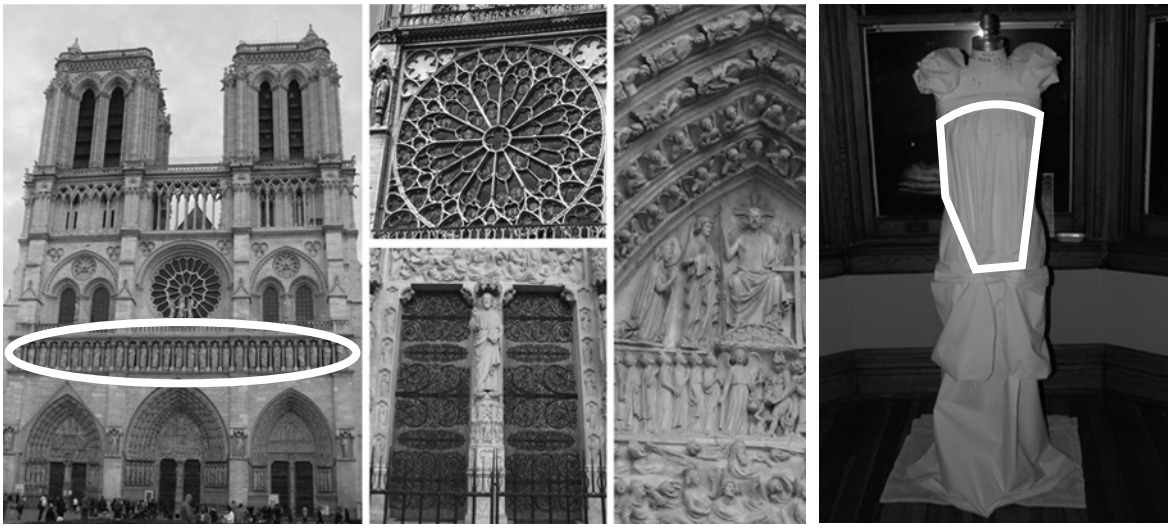
5.31 Design Process: Source of Inspiration



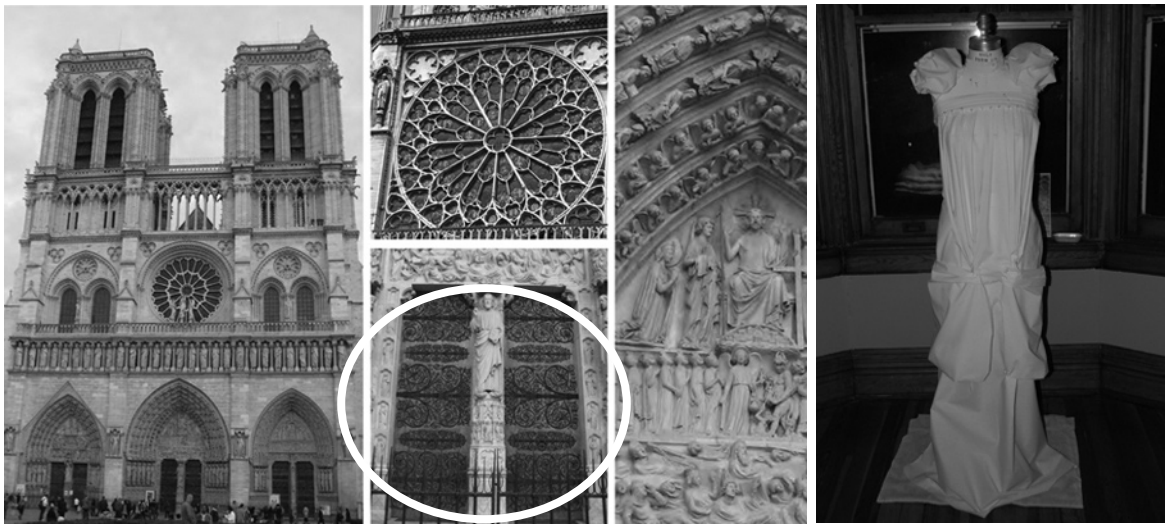
5.32 Design Process: Translation



"I liked the intricate details, especially the rosette."
(Audio file 4.1, 0:00-0:53)



"I saw some pleating applications here."
(Audio file 4.1, 0:00-0:53)

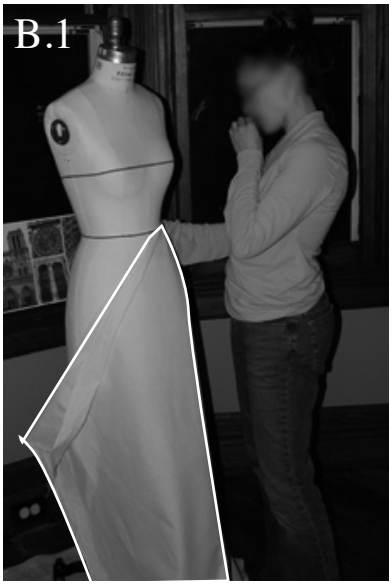


"I wanted to pull some detail from the doors, kind of like tree ornamentation. I was thinking of doing appliqué. Small, tiny appliqué."
(Audio file 4.1, 4:12-5:22)

5.33 Design Process: Draping

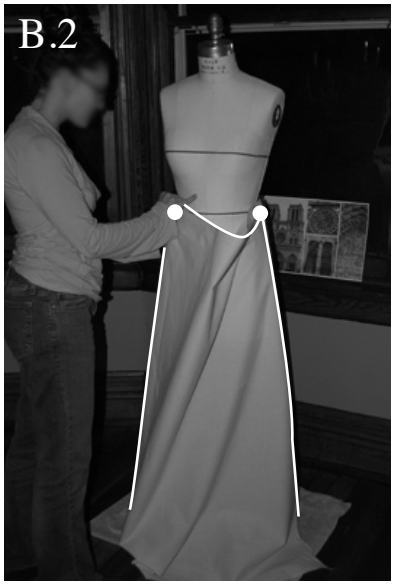
"I like to drape. I haven't done this in a while and I thought that I'd like to."
(Audio file 4.1, 6:40)

B.1



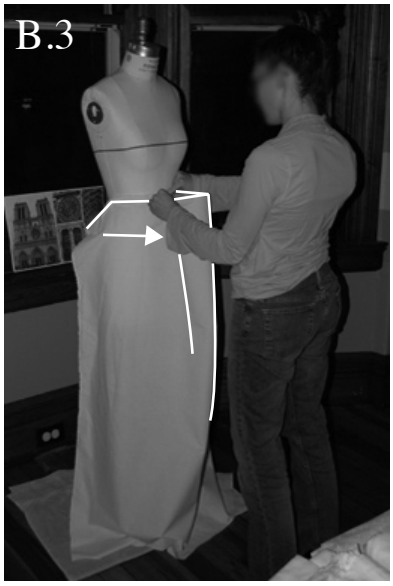
Action	new muslin fabric layer
Area	left hip
Type	decision
Effect	long skirt

B.2



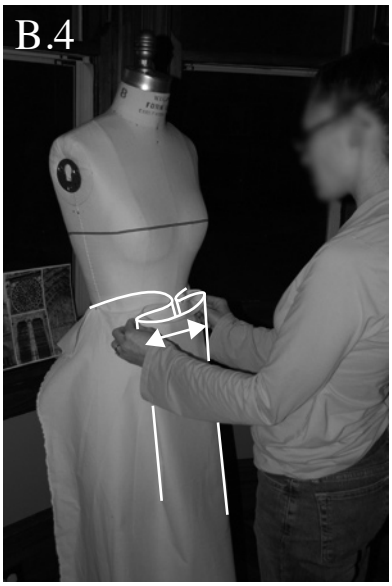
Action	pin fabric to form
Area	left and right hips
Type	decision
Effect	volume toward CF, fitted hips

B.3



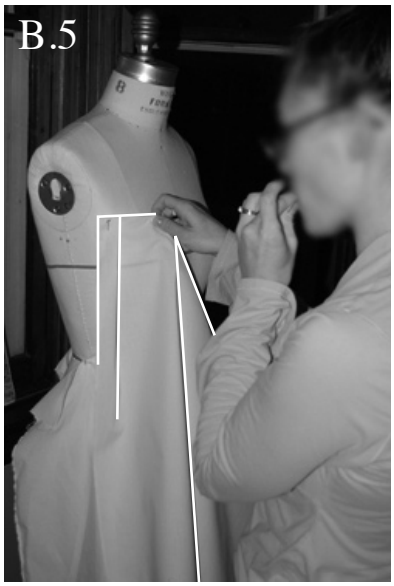
Action	pleating skirt
Area	CF waist
Type	decision
Effect	fit to form by removing exess fabric, creation of rectangular skirt

B.4



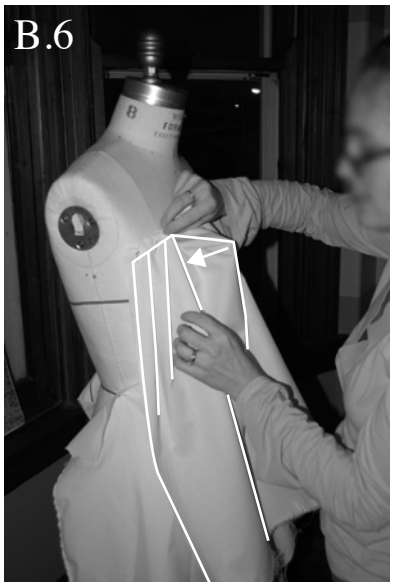
Action	box pleat
Area	CF waist
Type	decision
Effect	creates 2 vertical lines in skirt, volume flatteded to form

B.5



Action	new muslin fabric layer
Area	right side, over bust
Type	decision
Effect	covers bust, creates horiz. neckline

B.6



Action	small pleating
Area	neckline
Type	decision
Effect	pleats repeated from skirt, change in size and technique

B.7

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.8

Action	adjusting pleats
Area	neckline
Type	tuning
Effect	balance in pleat symmetry

B.9

Action	new muslin fabric layer
Area	not on form
Type	decision
Effect	small pleats repeat from top

B.10

Action	pleated adjusted to circular shape
Area	not on form
Type	decision
Effect	circular shape contrasts rectangular of skirt &top

B.11

Action	pins pleated fabric to top
Area	left side at waist
Type	idea testing
Effect	pleats on top repeated, asymmetrical volume

B.12

Action	pins pleated fabric to top
Area	CF waist
Type	idea testing
Effect	horiz. pleats contrast vertical on top

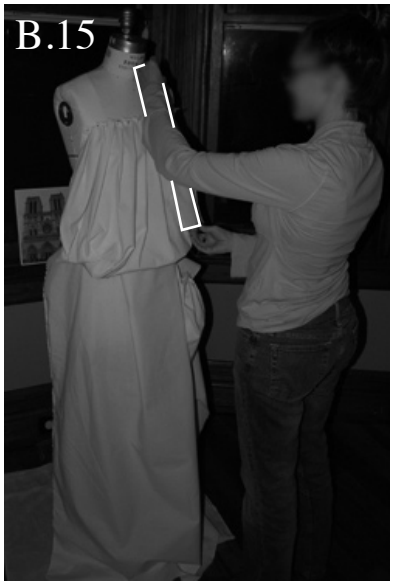
B.13

Action	rotates fabric vert., pins to skirt
Area	left hip
Type	decision
Effect	pleats from top repeated on skirt, asymm. volume

B.14

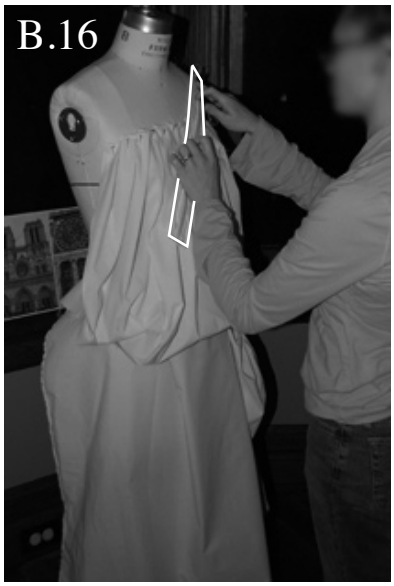
Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.15



Action	new muslin fabric layer
Area	left side over bust
Type	idea testing
Effect	vert. lines of top repeated, change in surface design (flat)

B.16



Action	rotate fabric on diag.
Area	from left shoulder
Type	idea testing
Effect	introduces diagonal line

B.17

Action	pleating fabric
Area	not on form
Type	decision
Effect	pleating from top repeated without change

B.18

Action	places fabric horiz.
Area	upper chest, neckline
Type	decision
Effect	horiz. pleats contrast vert. pleats of top

B.19

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.20

Action	stepping back farther
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.21

Action	pins fabric to top
Area	left SS
Type	decision #13 reverts back to #11
Effect	same as #11

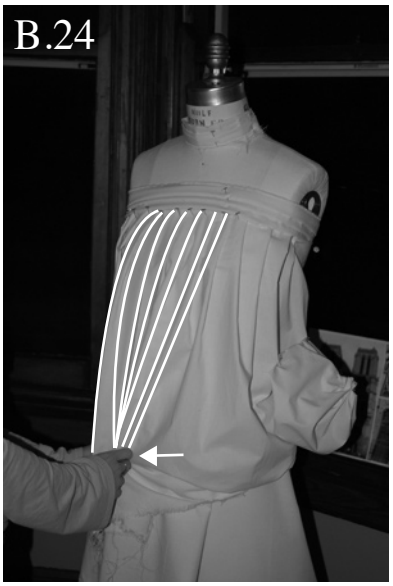
B.22

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.23

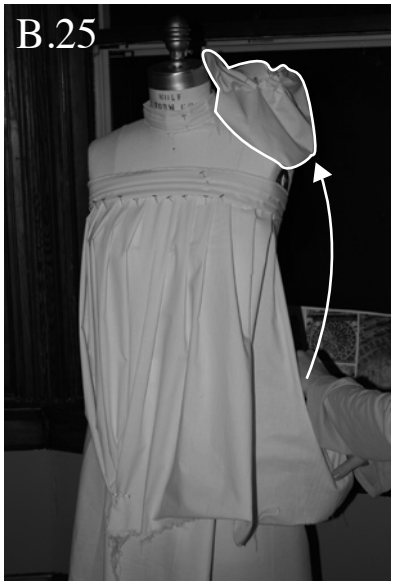
Action	stepping back farther
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.24



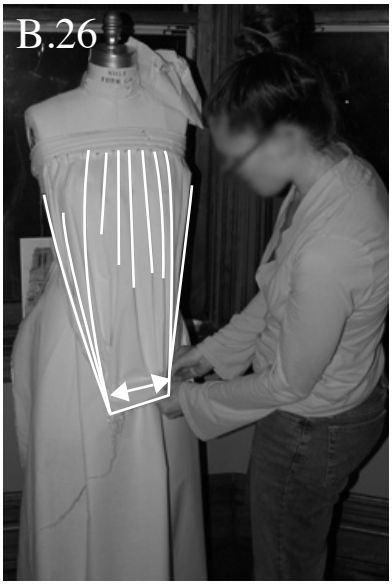
Action	gather pleats on top
Area	CF waist
Type	idea testing
Effect	lines from pleats converge, form diag.'s on outer edges

B.25



Action	moves circular pleated fabric to shoulder
Area	left shoulder
Type	decision
Effect	creates volume at shoulder, asymmetrical shape

B.26



Action	gathers pleats to either edge of waist
Area	front top
Type	decision
Effect	pleats from top meet at box pleat line on skirt

B.27

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.28

Action	adjusting volume
Area	left shoulder
Type	tuning
Effect	small increase in volume at left shoulder

B.29

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

B.30

Action	new muslin fabric layer
Area	not on form
Type	decision based on #10
Effect	repeating same technique and form exactly

B.31

Action	placing fabric on form
Area	right shoulder
Type	decision
Effect	creates symmetry of form

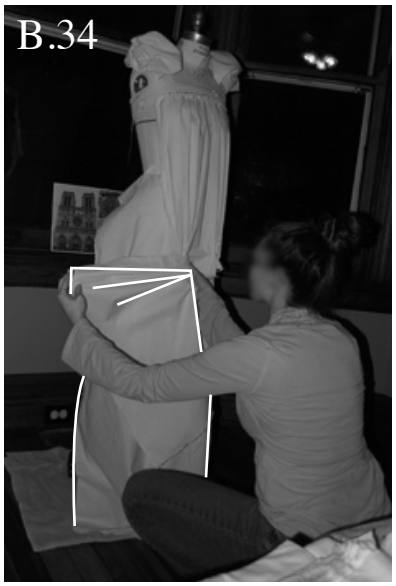
B.32

Action	stepping back
Area	whole garment, left side
Type	evaluation
Effect	balance of semi-completed garment as whole

B.33

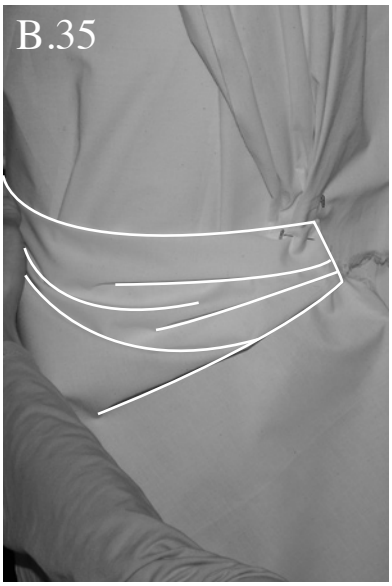
Action	stepping back
Area	whole garment, right side
Type	evaluation
Effect	balance of semi-completed garment as whole

B.34



Action	new muslin fabric layer
Area	right thigh
Type	decision
Effect	repeats rectangular shape

B.35

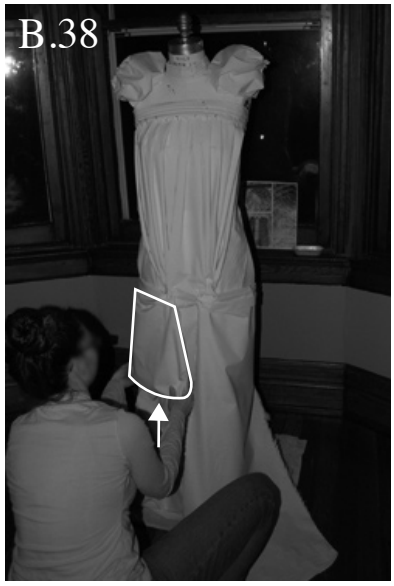


Action	horiz. / semi-diag. pleating from box pleat to SS
Area	right thigh
Type	decision
Effect	repeats horiz. pleating

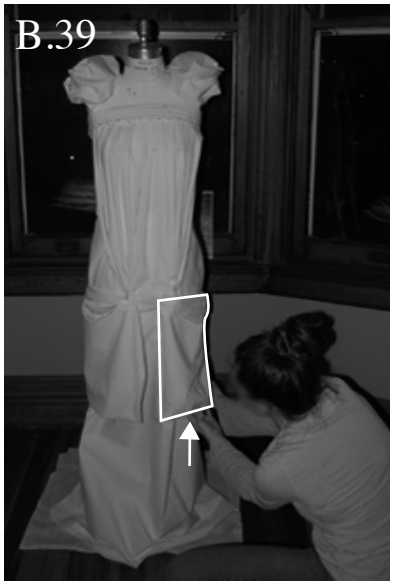
B.36

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

Action	new muslin fabric layer
Area	left thigh
Type	decision, based on #34-35
Effect	mirror symmetry of #34-35



Action	shortens fabric
Area	right thigh
Type	decision
Effect	creates smaller rectangle & shorter hemline



Action	shortens fabric
Area	left thigh
Type	decision, reflection of #38
Effect	mirror symmetry of #38

Action	adjusting vert. lines of fabric to align with box pleat
Area	right and left thighs
Type	tuning
Effect	adjusting vert. lines

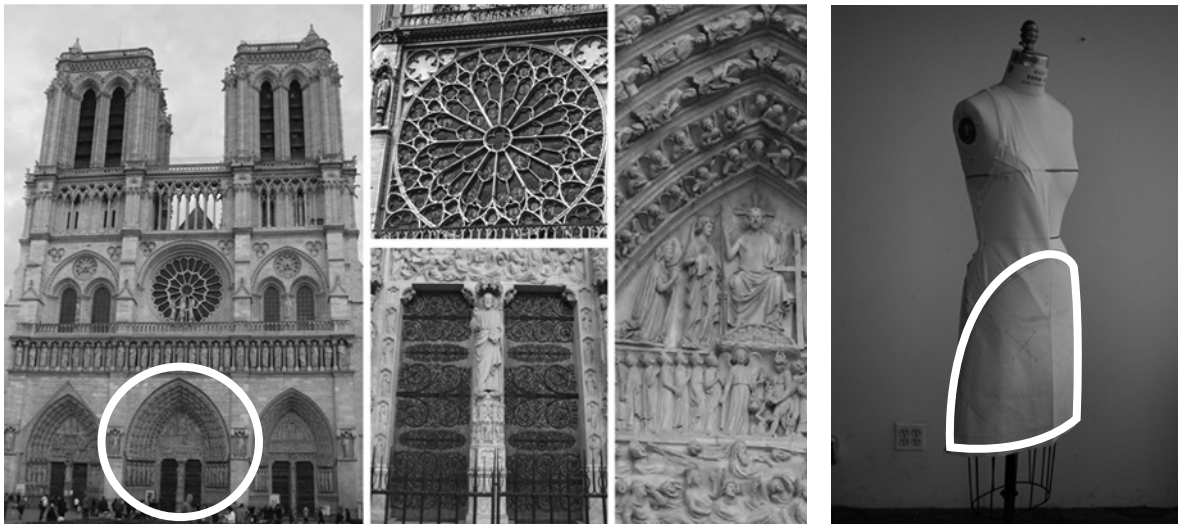
Action	new muslin fabric layer
Area	right and left shoulder, diag. across chest
Type	decision
Effect	functional consideration to attach shouler pieces

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

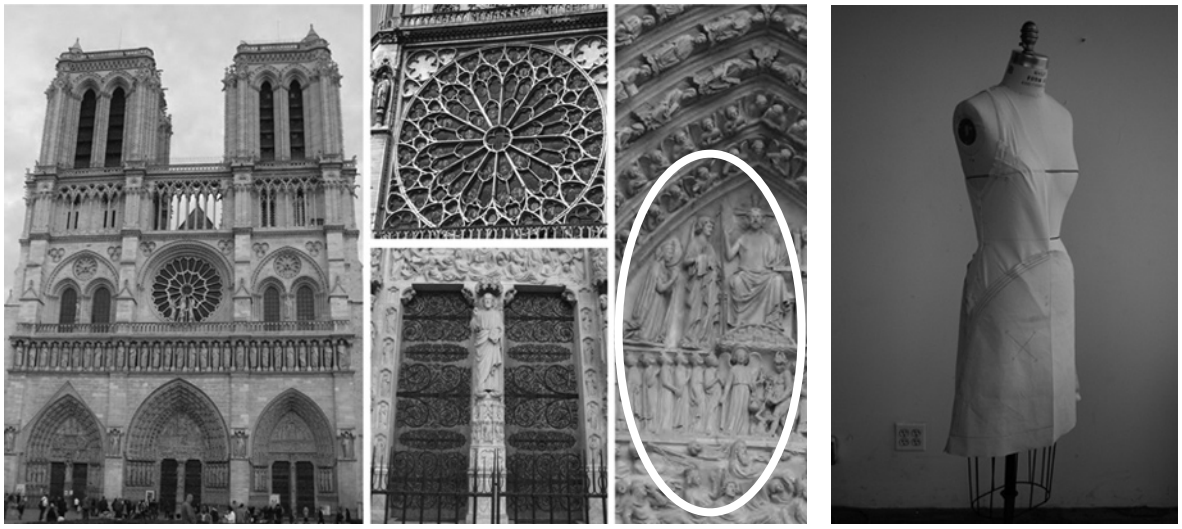
5.4 Design Participant C

5.41 Design Process: Source of Inspiration

5.42 Design Process: Translation

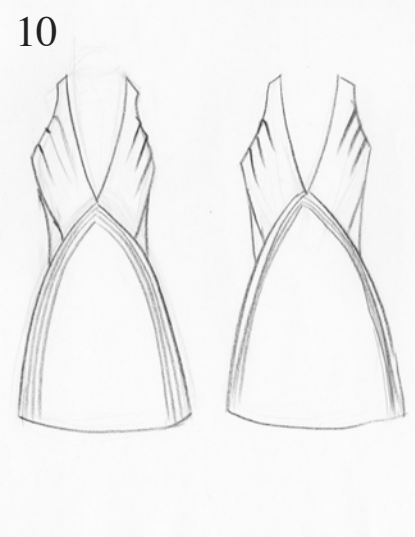


"The arch shape here. It was the same idea... I made some seam lines like this arch."
(Audio file 6.1, 0:43-1:23)



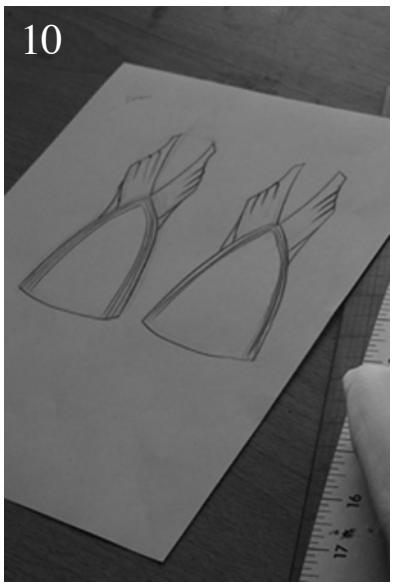
"...The draping theme came from the classic draping..."
(Audio file 6.1, 0:43-1:23)

5.43 Design Process: Sketching



5.44 Design Process: Draping

This designer chose the between-domain image of Notre Dame, as the inspiration for his design process. He participated in the sketching session, resulting in a total often flats, and then selected one of those (#10 from the sketching croquis) to use as a starting point for the draping process.

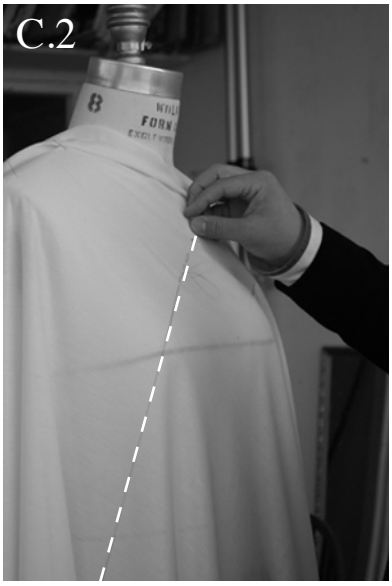


"Generally, I first choose a theme, then craft the fabrics. I usually need fabrics and trim, something like that [in addition to the inspiration]. I only have four pictures [to choose from] so it is a little hard to process…. After that color, then design, then make samples, and change the fabrics.... Color and fabric are both together."
(Audio file 6.1, 5:35-6:32)

C.1

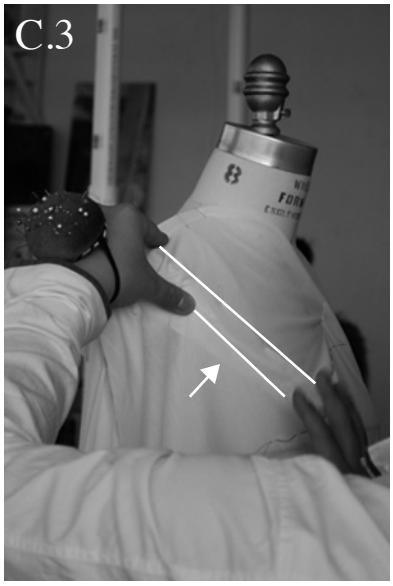
Action	pins jersey fabric to form
Area	right shoulder
Type	decision
Effect	covers right side of body

C.2



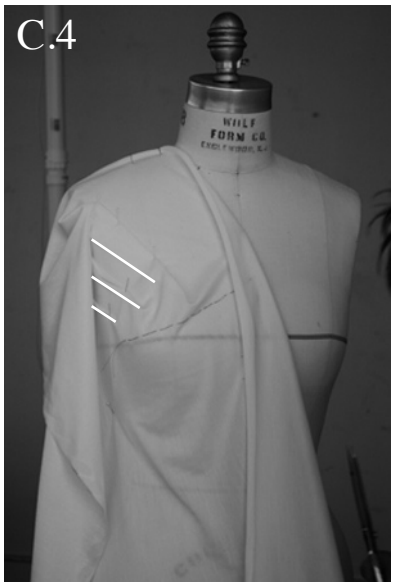
Action	thread trace LR diag.
Area	from left shoulder to right hip
Type	decision
Effect	marks bias line

C.3



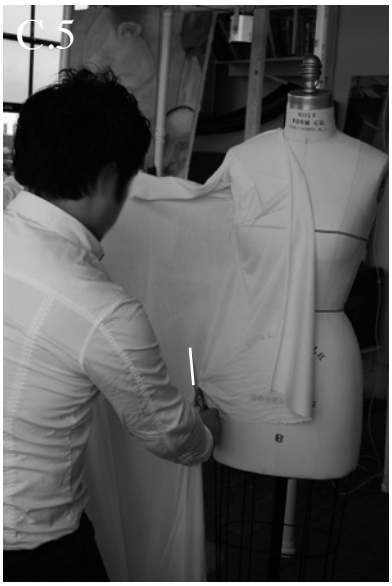
Action	removes excess fabric to create dart
Area	right artmhole to right bust
Type	decision
Effect	fits fabric around bust

C.4



Action	pins two more darts
Area	right armscye to right bust
Type	decision
Effect	fits fabric around bust, creates three style lines

C.5



Action	cuts excess fabric
Area	beyond right SS
Type	decision
Effect	creates SS

C.6

Action	clips excess fabric
Area	beyond right SS
Type	tuning
Effect	fabric fitted to side with shaped seam

C.7

Action	traces neckline
Area	from right shoulder to CF bust line
Type	decision
Effect	creates V neckline

C.8

Action	traces SS
Area	right SS
Type	decision
Effect	creates SS

C.9

Action	removes fabric from form, cuts excess from beyond the seamline
Area	on table
Type	tuning
Effect	creates pattern

C.10

Action	re-pins fabric to form
Area	front bodice
Type	tuning
Effect	trying pattern on the form

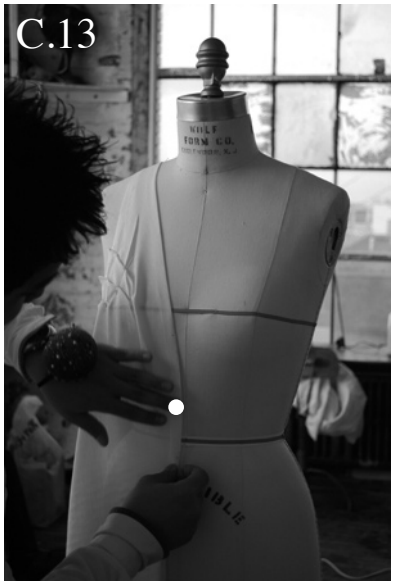
C.11

Action	lowers neckline
Area	CF torso
Type	decision
Effect	more of the chest/torso is revealed

C.12

Action	removes fabric from form, cuts excess beyond seamline
Area	on table
Type	tuning
Effect	creates pattern

C.13

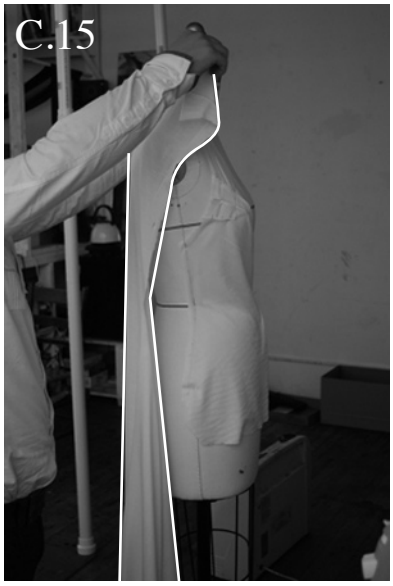


Action	re-pins fabric to form
Area	CF bodice
Type	tuning
Effect	trying modified pattern on the form

C.14

Action	re-pins fabric to form
Area	SS bodice
Type	tuning
Effect	trying modified pattern on the form

C.15



Action	adds jersey fabric piece to back
Area	back bodice
Type	decision
Effect	covering back of form

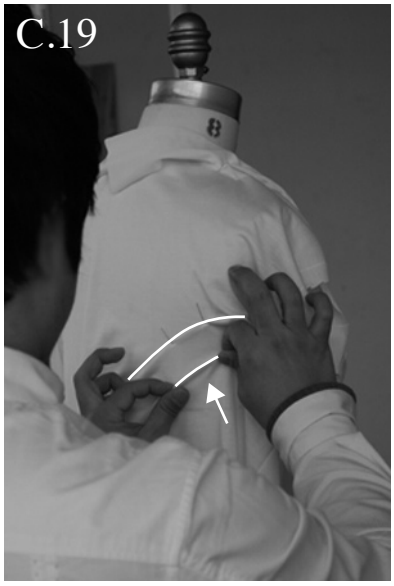
C.16

Action	pins excess fabric together
Area	from CB and SS toward center of fabric
Type	decision
Effect	creates back waist dark

C.17

Action	cuts excess fabric
Area	beyond CB
Type	tuning
Effect	creates CB seamline

Action	smooths fabric
Area	from back to right SS
Type	tuning
Effect	fitting fabric to the form



Action	removes excess volume by creating darts
Area	back right, from armhole toward CB
Type	decision
Effect	fitting fabric to form

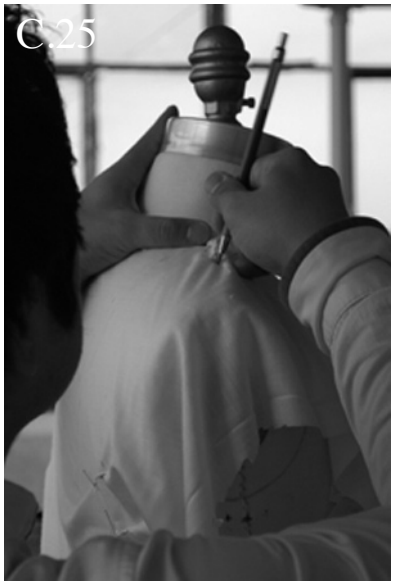
Action	repeats darts, three total
Area	back right, from arm-hold toward CB
Type	decision
Effect	fits fabric to back, cre-ates reflection of #4

Action	removes third dart
Area	back right, from armhole toward CB
Type	decision #21 reversed
Effect	design adjusted in favor of fit

Action	clips neckline
Area	back neck
Type	decision
Effect	fitting fabric to form from high neckline

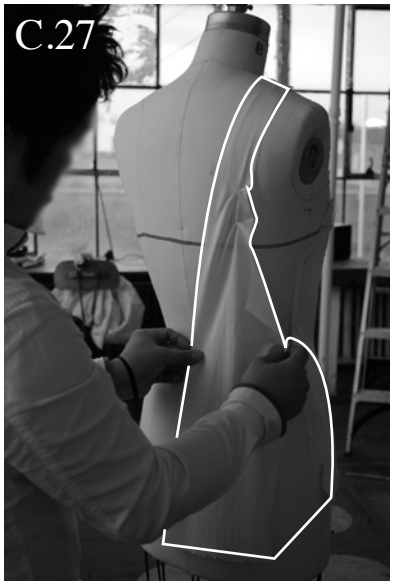
Action	CB seamline
Area	CB
Type	tuning
Effect	creates CB seam

Action	traces back darts
Area	back, from armhole toward CB
Type	tuning
Effect	creates darts for pattern seams



Action	traces shoulder seamline
Area	from neck to armhole
Type	tuning
Effect	creates shoulder seamline for pattern

Action	removes fabric from form & cuts excess fabric from pattern piece
Area	on table
Type	tuning
Effect	adjusts as a flat pattern



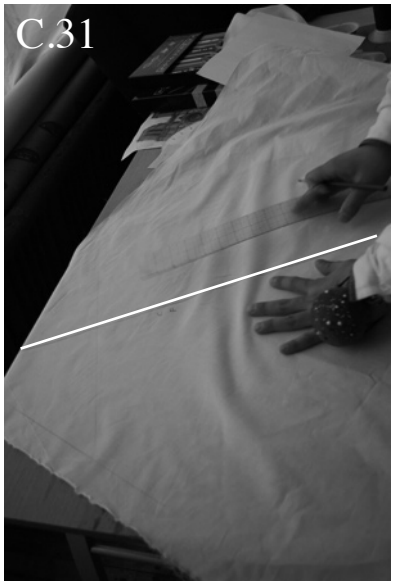
Action	re-pins fabric to form
Area	back, right side
Type	tuning
Effect	trying modified pattern on the form

Action	pins front and back pieces together
Area	right SS
Type	tuning
Effect	balancing SS

Action	removes fabric from form, cuts hemline
Area	on table
Type	decision
Effect	creates hemline as flat pattern

Action	cuts new muslin fabric piece
Area	-
Type	decision
Effect	contrast of fabric surface and construction

C.31



Action	draws bias line
Area	on table
Type	tuning
Effect	line indicates fabric bias

C.32

Action	pins fabric to form on bias line
Area	CF
Type	decision
Effect	creates skirt portion

C.33

Action	pins fabric
Area	right and left hip at SS
Type	tuning
Effect	creates symmetry

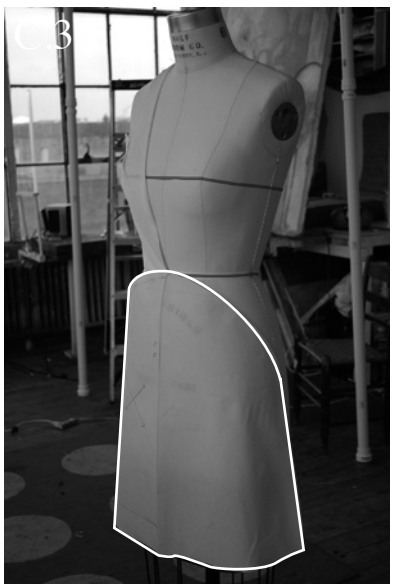
C.34

Action	traces waistline
Area	from CF to right hip
Type	decision
Effect	curved line derived from inspiration, contrasts angled lines

C.35

Action	removes fabric from form, cuts excess outside of seamline
Area	on table
Type	tuning
Effect	creates flat pattern

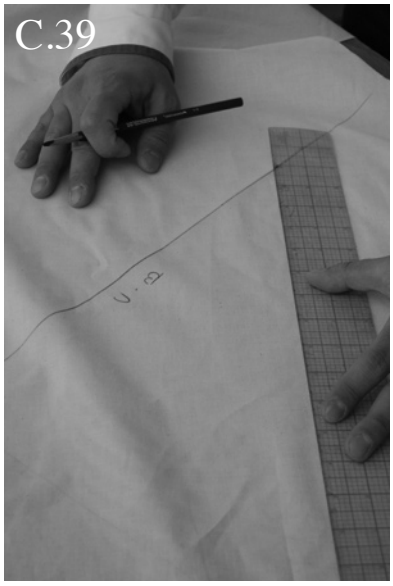
C.36



Action	re-pins fabric to the form and steps back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

Action	removes fabric from form & draws style lines
Area	from CF to hemline
Type	decision
Effect	repeats waistline seam

Action	re-pins fabric to the form and steps back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole



Action	creates CB same as CF, leaves excess at SS
Area	on table
Type	decision, repetion of #31-36
Effect	reflection of #31-35

Action	re-pins fabric to form, pins back and front panels together
Area	along right SS
Type	decision
Effect	balancing SS

Action	traces style line detailing
Area	from CB to right hemline
Type	decision, repetition of #38 from the front piece
Effect	reflection of #38

Action	pins back skirt to form
Area	on CB and left SS
Type	tuning
Effect	balancing back skirt with front

C.43

Front view of garment at the end of the draping session

5.5 Design Participant D

5.51 Design Process: Source of Inspiration

"...In architecture there's a lot to draw from and with Gaudi it was even more. I know his other buildings. They're always kind of crazy and quirky, and have amorphous shapes, which I thought that translated to fabric. I wanted to do something like that."
(Audio file 3.1, 0:20-1:00)

5.52 Design Process: Translation

"The amorphous shapes, which I thought that translated to fabric...."
(Audio file 3.1, 0:20-1:00)

"The turret.... I feel that it is more sculptural..."
(Audio file 3.1, 1:00-1:37)

"Originally I was trying to roll the fabric to try to create this… I wanted to have something like cotton batting or some sort of piping or cording.... I was thinking about that shape and also thinking about how to make the fabric more curved."
(Audio file 3.1, 3:00-3:48)

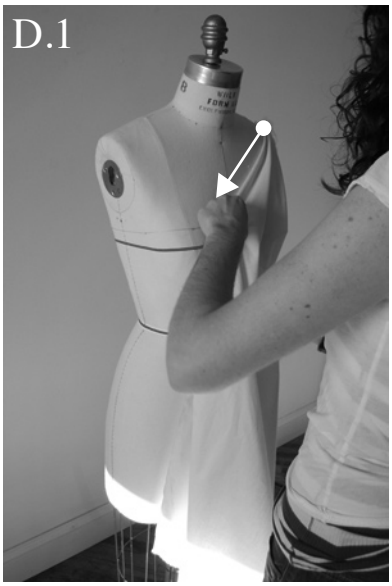
"When you look at the lines, like the line of the roof, the ridge next to the turret, how it looks like its toppling over. I really liked that idea, its sort of an organic shape as opposed to very structured....these are more fluid, organic lines."
(Audio file 3.1, 4:35-5:22)

5.53 Design Process: Draping

This designer chose the between-domain image of the Gaudi architecture, as the inspiration for her design process. She did not participate in the sketching session, but chose to begin draping immediately using only muslin fabric.

"I thought of this as more of a fun, sculptural, artistic project as opposed to something that someone is going to have to wear."
(Audio file 3.1, 10:46-11:52)

D.1



Action	gathering to CF (muslin)
Area	left shoulder to CF
Type	idea testing
Effect	left side neckline, diag. lines

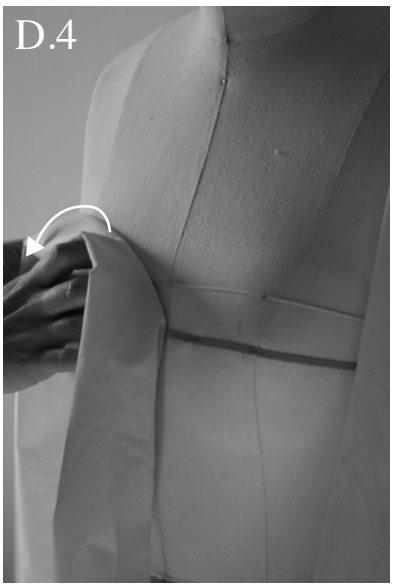
D.2

Action	loose drape toward waist
Area	left shoulder to waist
Type	idea testing
Effect	left side neckline, curved diag. lines

D.3

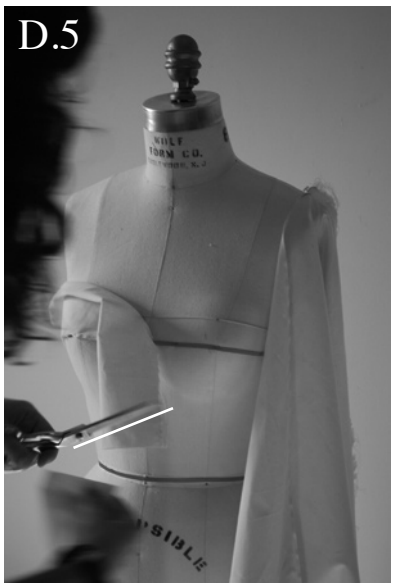
Action	new fabic layer (muslin)
Area	right bust
Type	idea testing
Effect	right side neckline

D.4



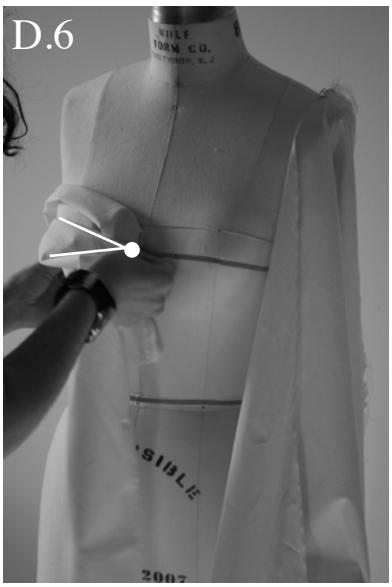
Action	fabric folded over itself once
Area	over right bust
Type	decision
Effect	horiz./curved line and slight volume away

D.5



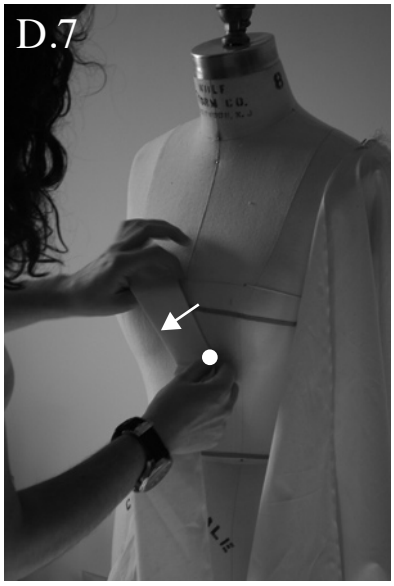
Action	fabric trimmed
Area	below right bust
Type	decision
Effect	shortens fabric length

D.6



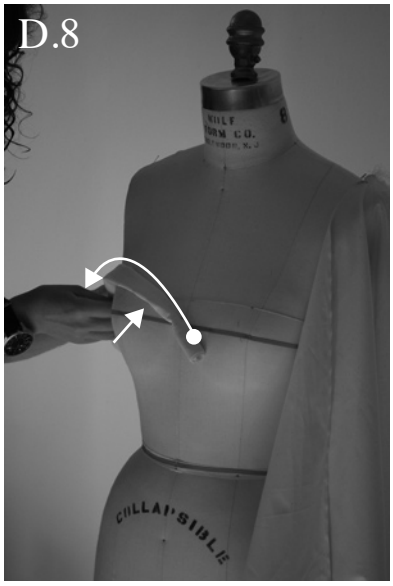
Action	two pleats oriniating at CF
Area	CF to right bust
Type	idea testing
Effect	fitted to body, repeats line from #4 but straight

D.7



Action	increase in fold width, lowered neckline
Area	over right bust
Type	decision #4 altered
Effect	increased volume away from body, RL diag. line

D.8

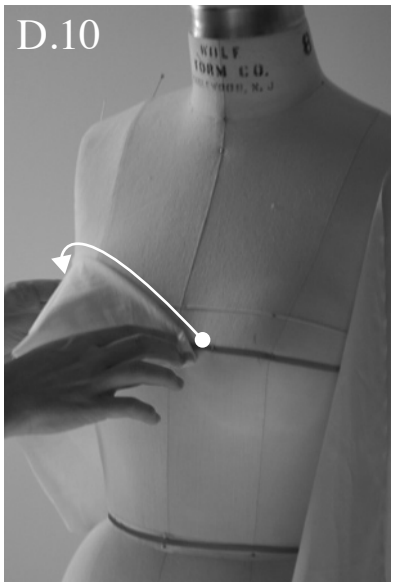


Action	decreased fold width, raised & curved neckline
Area	over right bust
Type	idea testing
Effect	decreased volume away from body, curved diag.

D.9

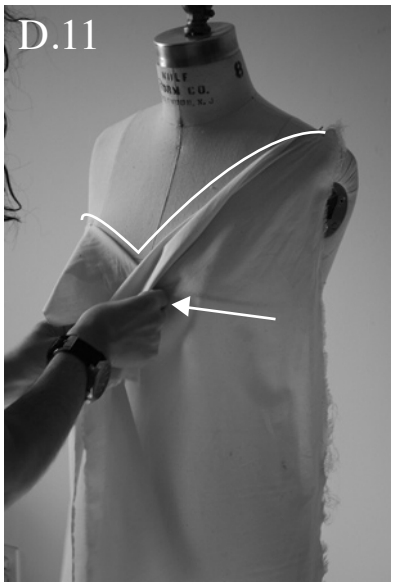
Action	removes fabric & rolls
Area	not on body form
Type	idea testing
Effect	fold (flat) become roll (rounded)

D.10



Action	rolled fabric applied to body
Area	over right bust
Type	decision
Effect	right neckline, small surface detail, curved diag.

D.11



Action	gathering toward CF
Area	left shoulder to CF
Type	idea testing
Effect	completed neckline, LR diag. contrasts diag. #10

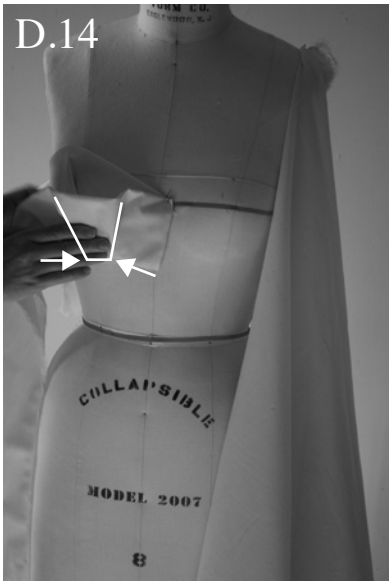
D.12

Action	new fabric layer
Area	under right bust neckline
Type	idea testing
Effect	line of neckline repeated, rolled surface becomes flat

D.13

Action	inverted box pleat
Area	right bust
Type	idea testing
Effect	pleat forms one vertical line, contrasting #12

D.14

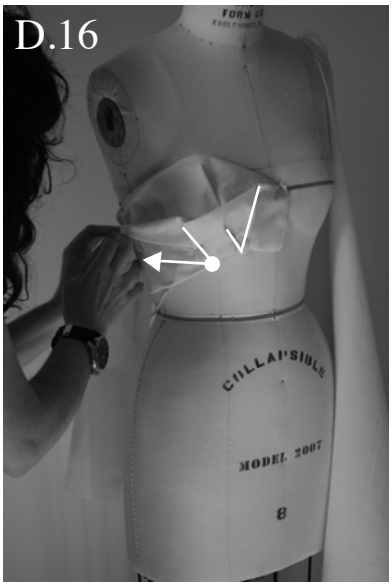


Action	box pleat
Area	right bust
Type	decision
Effect	two vert. lines, increase in volume away from body

D.15

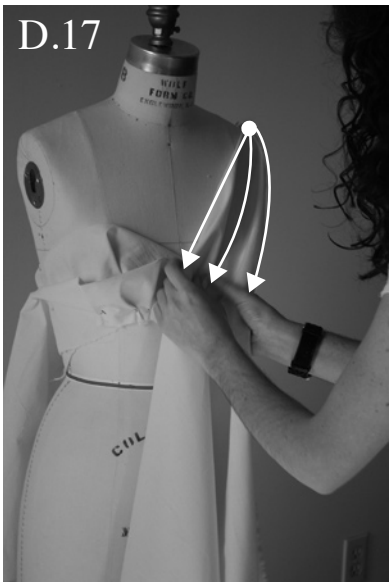
Action	pleating continued
Area	side of right bust
Type	decision
Effect	continuation of #14

D.16



Action	pleating continues
Area	around to SS
Type	decision
Effect	continuation of #14

D.17



Action	gathering from shoulder to CF
Area	from left shoulder to CF
Type	idea testing
Effect	neckline, gathers orig. from pleats, LRdiag. line

D.18

Action	fabric trimmed
Area	left side body
Type	decision
Effect	decreased length of fabric

D.19

Action	new fabric layer(muslin)
Area	torso, below right bust
Type	decision
Effect	flat, fitted surface contrasts pleated volume over bust

D.20

Action	gathering from left shoulder to waist
Area	left shoulder to waist
Type	idea testing
Effect	creates neckline, LR diag.. lines

D.21

Action	pleating
Area	left shoulder to right SS
Type	decision
Effect	pleats from bust repeated, changed in size (longer) and line (diag.)

D.22

Action	pleating
Area	from left shoulder to waist
Type	decision
Effect	continuation of #21

D.23

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

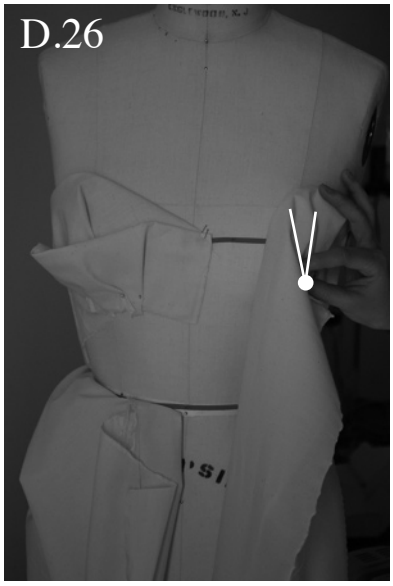
D.24

Action	removes fabric from left shoulder
Area	left torso to waist
Type	decision
Effect	decisions #20-22 reversed

D.25

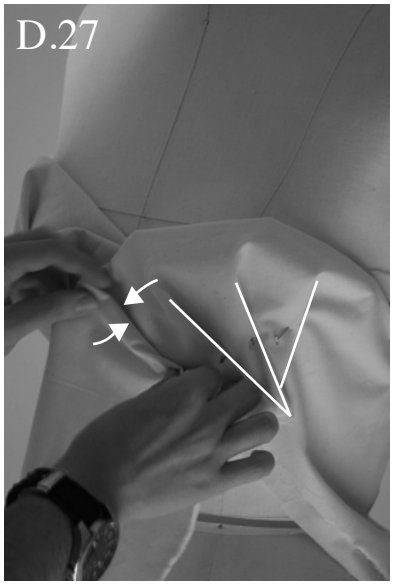
Action	new fabric layer
Area	over left bust
Type	decision
Effect	symmetrical neckline

D.26



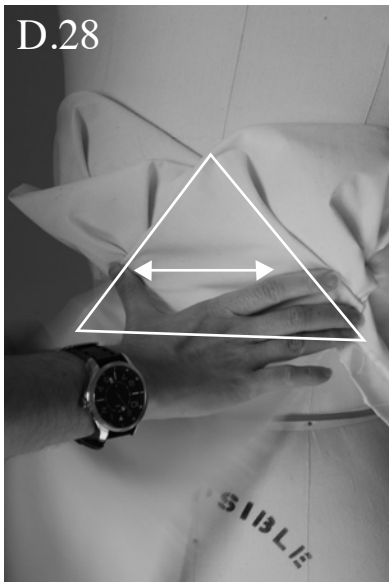
Action	vert. pleating
Area	left bust
Type	decision
Effect	fabric fitted to form, re-peating pleats from right side with small changes

D.27



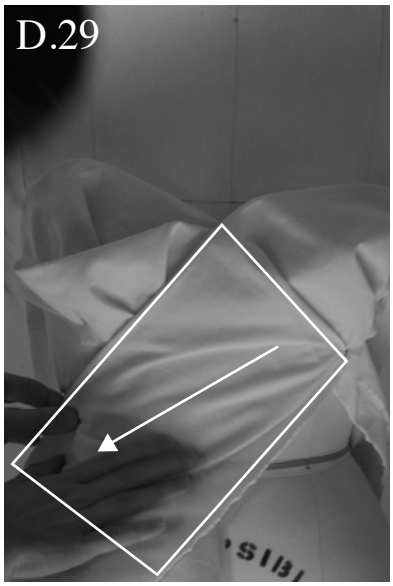
Action	pleating
Area	left bust, toward CF
Type	decision
Effect	continuation of #26

D.28



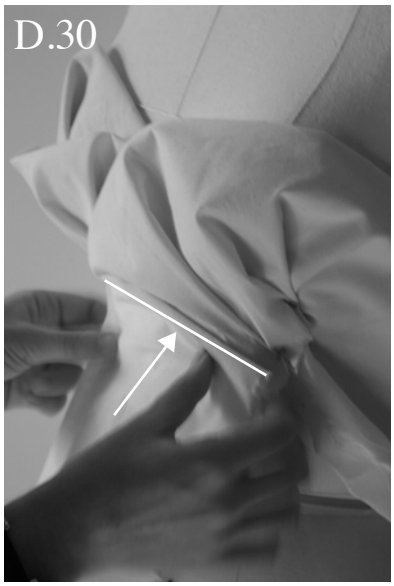
Action	spreads flat
Area	CF torso
Type	decision
Effect	flat surface contrasts pleated surface & fitted vs. volume

D.29



Action	smooths diag. to waist
Area	CF torso to right waist
Type	decision
Effect	continuation of #28

D.30



Action	one pleat
Area	under left bust
Type	decision #28 changed
Effect	continuation of #27, fabric fitted to form

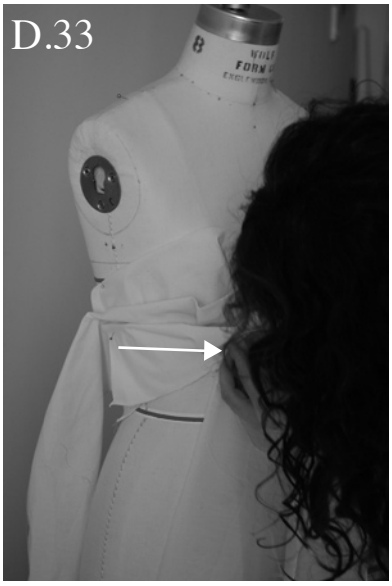
D.31

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

D.32

Action	new fabric layer (muslin)
Area	from right SS
Type	decision
Effect	covers lower torso

D.33

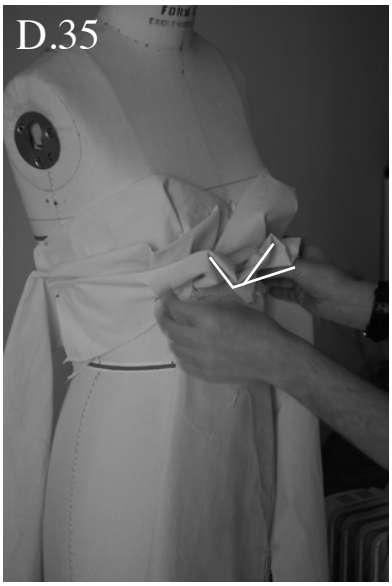


Action	flattens fabric toward CF
Area	right SS toward CF
Type	decision
Effect	flat panel contrasts pleated bust

D.34

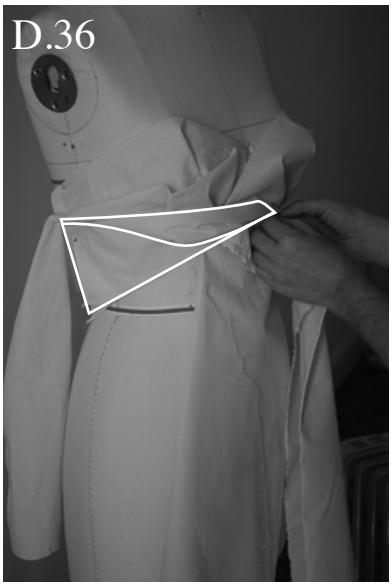
Action	gathering fabric
Area	CF torso
Type	idea testing
Effect	repeats pleating on bust with change in size (smaller) and technique

D.35



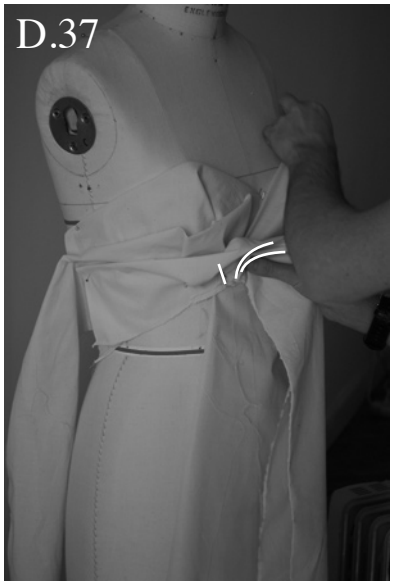
Action	increase in gathering
Area	CF torso
Type	idea testing
Effect	same as #34, with an additional increase in number

D.36



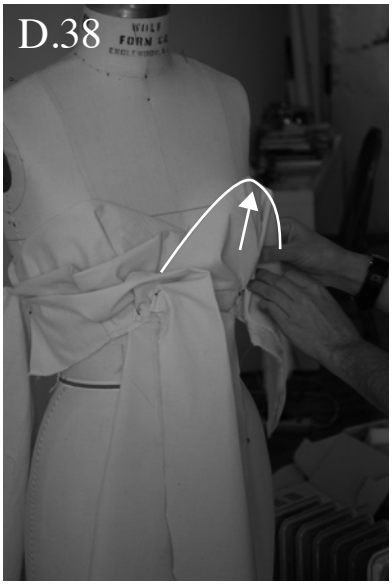
Action	fabric folded overtop itself
Area	from SS to CF
Type	decision
Effect	adds line to flat surface

D.37



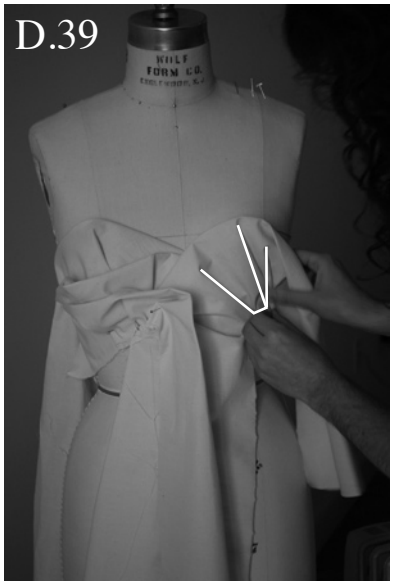
Action	pleating
Area	CF
Type	decision
Effect	creates volume away from the body form, repeats pleating on bust

D.38



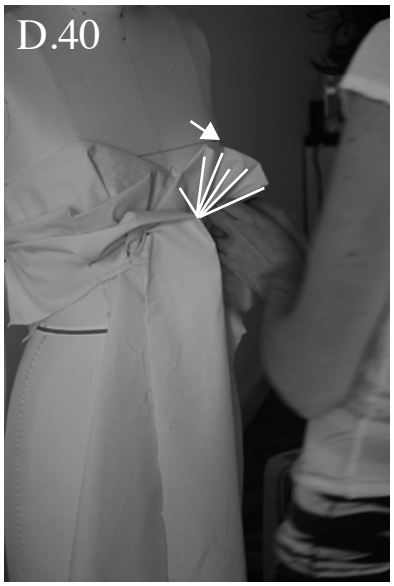
Action	raising neckline
Area	left bust
Type	decision (alters #25-27)
Effect	creates more symmetrical neckline

D.39



Action	pleating
Area	over left bust
Type	idea testing
Effect	repeats pleating on right bust with change of line direction

D.40

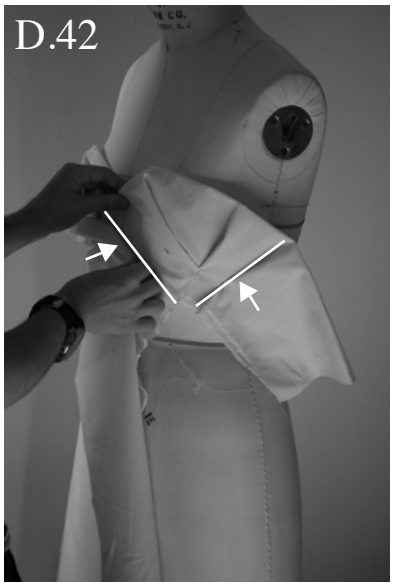


Action	increase in pleating
Area	over left bust
Type	idea testing
Effect	increased volume away from body , increases line

D.41

Action	decrease in pleating
Area	over left bust
Type	decision based on #39-40 (alters #38)
Effect	fitted to form, reduced line creates flat surface

D.42

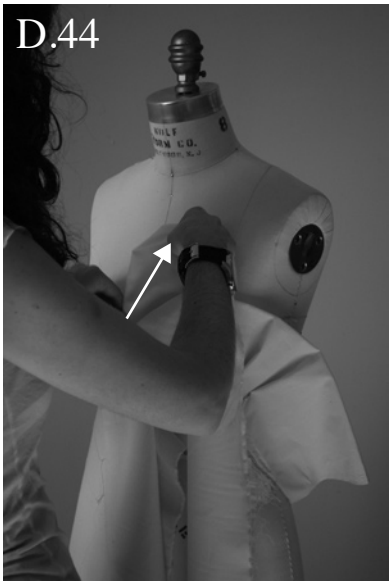


Action	continuation of pleating
Area	over left bust, toward CF & SS
Type	decision
Effect	repeat of diag... lines, fitted to form

D.43

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

D.44

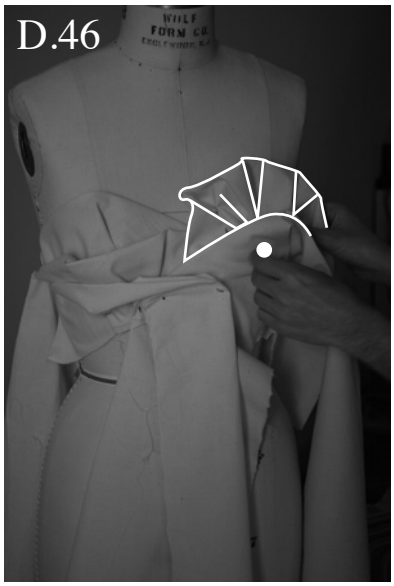


Action	new fabric layer(muslin)
Area	beneath top of left bust fabric
Type	decision
Effect	raises neckline on left side, creates asymmetry

D.45

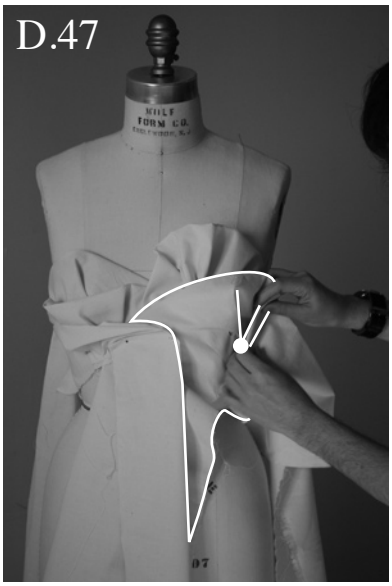
Action	pleating
Area	over left bust
Type	decision
Effect	repeats pleating on bust, increase in volume and number

D.46



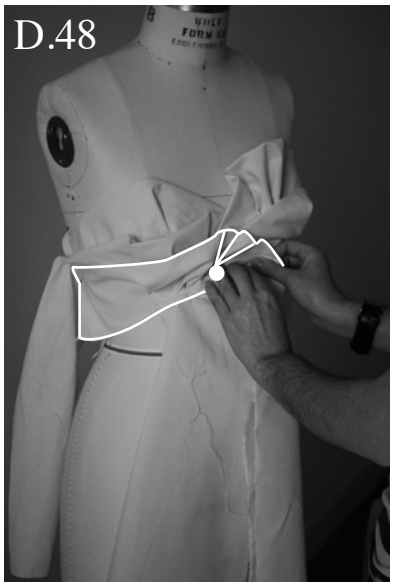
Action	continuation of pleating
Area	over left bust
Type	decision
Effect	same as #45

D.47



Action	single pleat
Area	left side torso
Type	decision
Effect	repetition of bust pleats from #39, fitted to waist

D.48

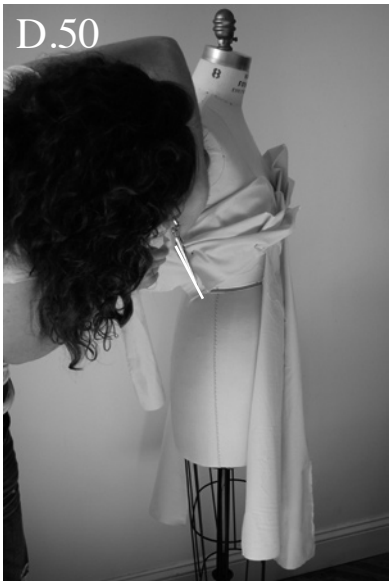


Action	pleating
Area	CF torso
Type	decision (alters #36-37)
Effect	fitted to CF, pleats re-peating with change

D.49

Action	one pleat
Area	left side torso
Type	decision
Effect	fitted to waistline, pleats repeated from bust witout volume

D.50



Action	trim excess fabric
Area	right SS
Type	decision
Effect	creates right SS

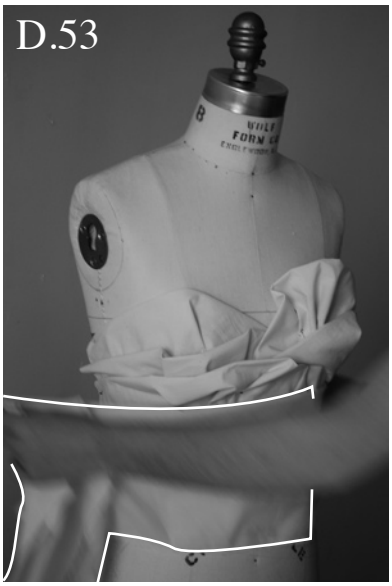
D.51

Action	trim excess fabric
Area	left SS
Type	decision
Effect	creates left SS

D.52

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

D.53



Action	new fabric layer
Area	high waist
Type	decision
Effect	covers body, fitted to form

D.54

Action	diag. fold to waistline
Area	high waist
Type	decision
Effect	modified pleat

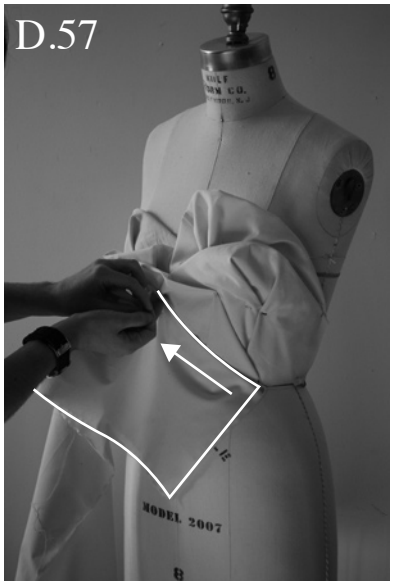
D.55

Action	new fabric layer
Area	left waistline to under right bust
Type	idea testing
Effect	flat panel contrasts previous surface texture

D.56

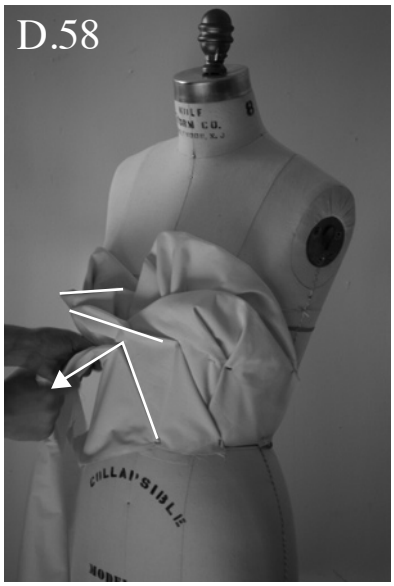
Action	removal of fabric layer & stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

D.57



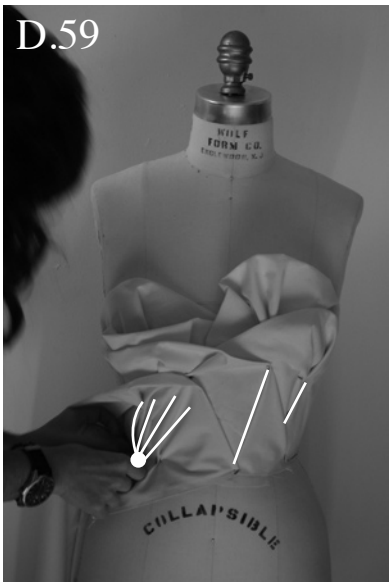
Action	new fabric layer
Area	left waistline to CF
Type	decision
Effect	increased width from #55

D.58



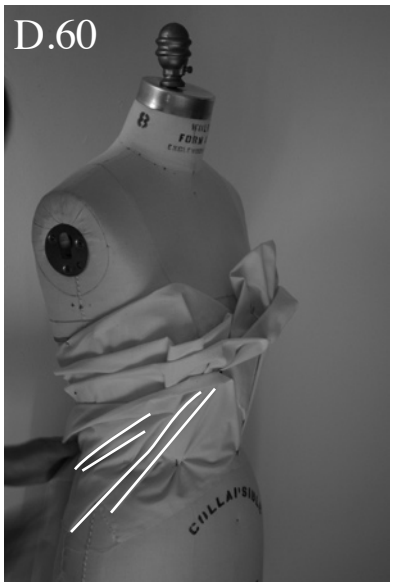
Action	folding over
Area	under right bust
Type	decision
Effect	repeats semi-horizontal lines and volume on right side

D.59



Action	small diagonal gathers
Area	right torso to waistline
Type	idea testing
Effect	diagonals from bodice repeated with a different surface treatment

D.60



Action	gathers changed to folds
Area	right torso to SS
Type	decision
Effect	same as #59, shifting line gradiates line effect from #58 to #59

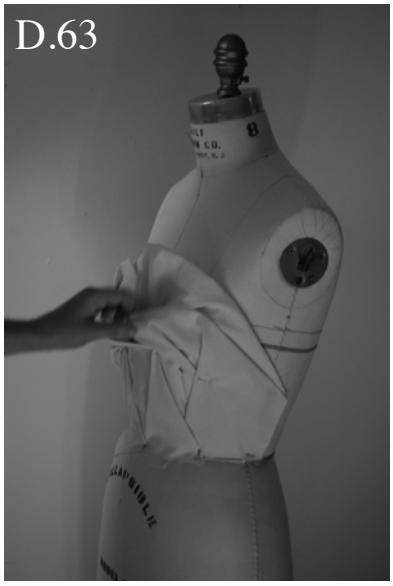
D.61

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

D.62

Action	minor adjustment of folds
Area	right side torso
Type	tuning
Effect	bodice viewed as a grouped whole

D.63



Action	minor increase of volume
Area	left bust
Type	tuning
Effect	bodice viewed as a grouped whole

D.64

Action	minor adjustment of folds
Area	right torso
Type	tuning
Effect	bodice viewed as a grouped whole

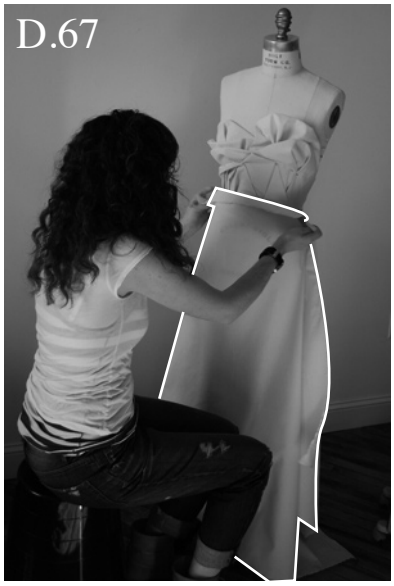
D.65

Action	minor adjustment of folds
Area	right SS
Type	tuning
Effect	bodice viewed as a grouped whole

D.66

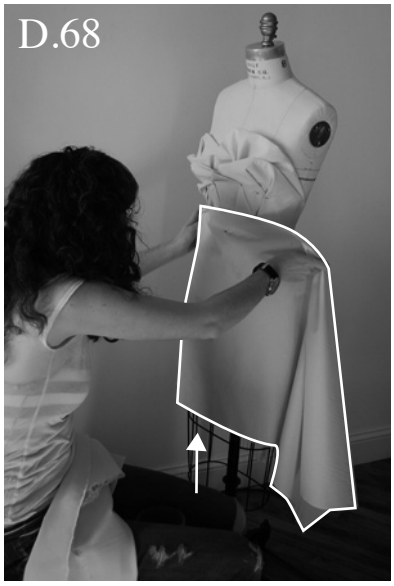
Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole after adjustments

D.67



Action	new fabric layer
Area	from waistline down legs
Type	idea testing
Effect	creates skirt portion of dress

D.68



Action	raise hemline
Area	from ankle to knee
Type	idea testing
Effect	less surface area of body covered

D.69

Action	pin fabric to form
Area	waistline
Type	decision
Effect	straight skirt, flat surface

D.70

Action	hip dart
Area	left hip
Type	decision
Effect	straight skirt becomes more fitted at waist and hips

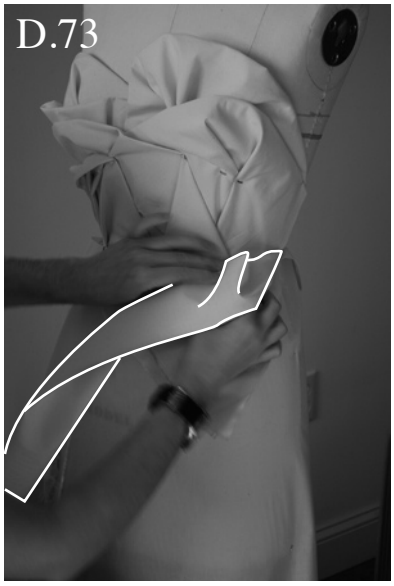
D.71

Action	hip dart
Area	right hip
Type	decision
Effect	creates symmetry in skirt portion

D.72

Action	new fabric layer on skirt
Area	from waist to high hip
Type	decision
Effect	voluminous peplum contrasts fitted skirt, volume mirrors that on bust

D.73

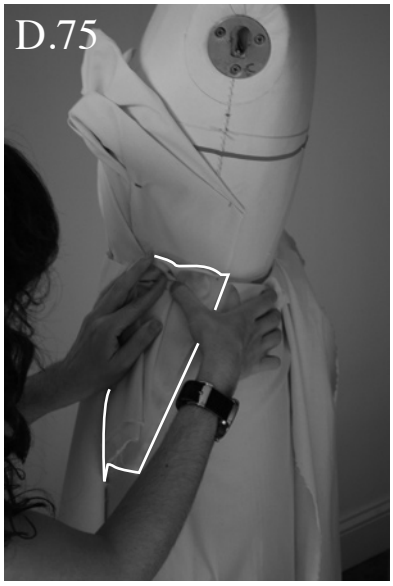


Action	gathers to peplum
Area	waistline
Type	decision
Effect	increase in volume away from body (contrasts waist & mirrors bust)

D.74

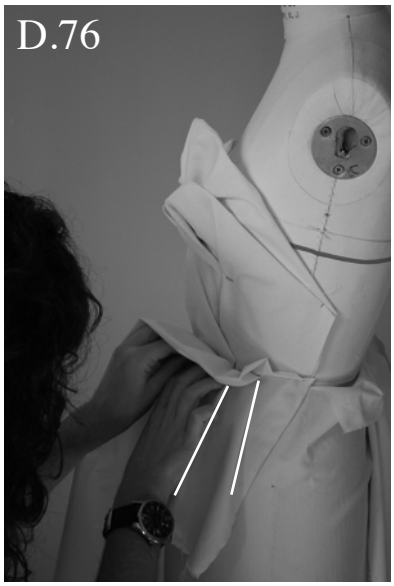
Action	continuation of gathers
Area	waistline
Type	decision
Effect	same as #73

D.75



Action	new fabric layer
Area	under peplum, left hip
Type	decision
Effect	balances asymmetry of peplum

D.76

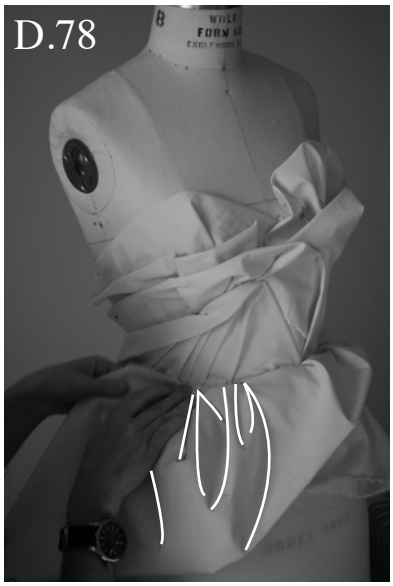


Action	gathers
Area	waistline
Type	decision
Effect	repetition of peplum's right side

D.77

Action	continuation of gathers
Area	waistline
Type	decision
Effect	same as #76

D.78

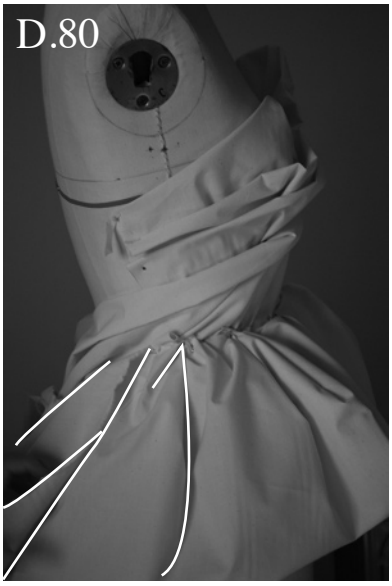


Action	continuation and increase of gathers
Area	outermost peplum layer toward right SS
Type	decision
Effect	same as #73

D.79

Action	continuation of gathers
Area	right side waistline
Type	decision
Effect	same as #73, continuation of line from high waist

D.80



Action	continuation and increase of gathers
Area	right side waistline to SS
Type	decision
Effect	same as #79

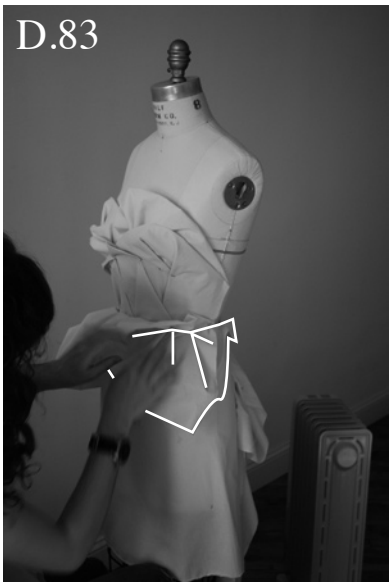
D.81

Action	moves form to view from front
Area	whole garment
Type	evaluation
Effect	balance of peplum

D.82

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

D.83



Action	new fabric layer, gathers
Area	right side, under left peplum
Type	decision
Effect	balances left side peplum

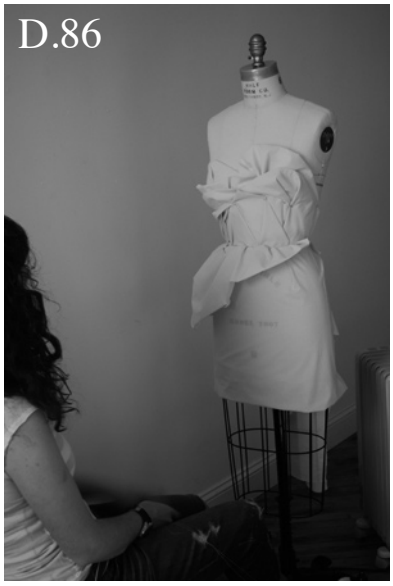
D.84

Action	continuation of gathers
Area	waistline
Type	decision
Effect	gathers repeat in size and length from right side

D.85

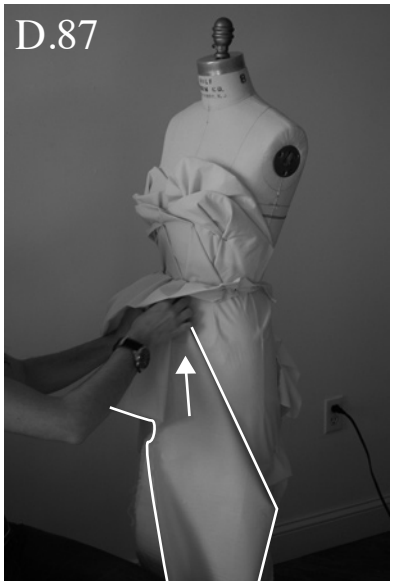
Action	cut out fabric layers
Area	left side under peplum
Type	decision reverses #75-77 & #83-84
Effect	peplum becomes asymmetrical

D.86



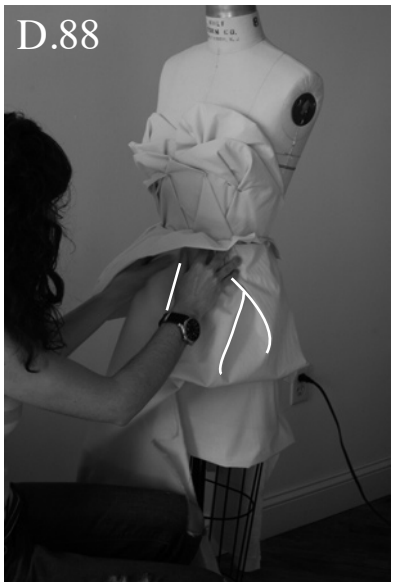
Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

D.87



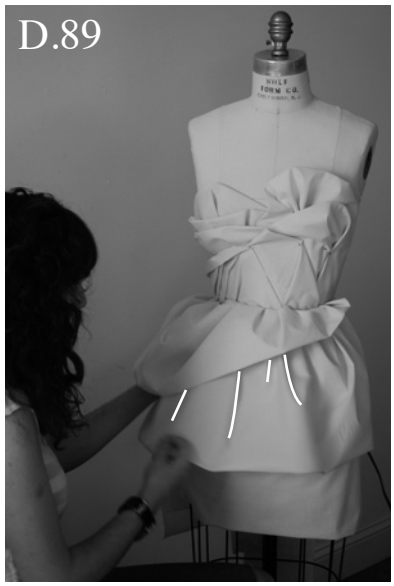
Action	new fabric layer
Area	left hip, under right peplum
Type	decision
Effect	same as #75-77 & #83-84, increased length

D.88



Action	gathers
Area	left hip
Type	decision
Effect	largest gathers, most volume, contrasts fitted skirt

D.89



Action	continuation of gathers
Area	waist to thigh
Type	decision
Effect	repeats straight hem on undermost skirt, symmetry contrasts peplum

D.90

Front view of garment at the end of the draping session

5.6 Design Participant E

5.61 Design Process: Source of Inspiration

"...there is so much in the picture."
(Audio file 5.2, 19:17-19:38)

"[I generally look for] things which grab your attention...you look for details."
(Audio file 5.2, 19:38-19:57)

5.62 Design Process: Translation

"In the picture I really liked this structure [above the windows]..."
(Audio file 5.1, 0:15-2:34)

"I really liked the structure on [the ridge and tiling of the roof]... [The tiles are] more rigid, but this is more unbalanced, sheer, so I thought maybe I'd mix these around the structure like that."
(Audio file 5.1, 0:15-2:34)

5.63 Design Process: Sketching

This designer chose the between-domain image of the Gaudi architecture, as the inspiration for his design process. He did not participate in the sketching session, but did complete one quick croquis sketch (see below) prior to begining the draping study.

"I drew this, but I don't know what I was going to do with it. I left space empty. I thought I had to make a dress out of this at some point... *really* construct a dress. I thought maybe that it's not possible...
I was thinking of soft gauze as the circles. It's not volume, it's flat, but it has some volume. Like when you put batting in it gets this bunched up look. That's what I wanted to create in that area. But, since we are not sewing, I'm going to think of making something else in that area ..."
(Audio file 5.1, 0:15-2:34)

5.64 Design Process: Draping

"There are some things that are totally draped, and there are some things that are structured. If it is really structured, then you just drape it and make panels or go straight from pattern, but if you keep playing with it you tend to find that something might look more beautiful than what was exactly done on the sketch. It's not that I stick to the sketch one hundred percent. No. I keep changing the design depending on how the fabric reacts, how I like the look of it, am I satisfied with it. If you're not happy with what you're making that it's useless… you're spending so much time on it."
(Audio file 1, 4:58-6:15)

E.1

Action	pins tape to form
Area	from right to left shoulder
Type	decision
Effect	creates neckline

E.2

Action	cuts muslin fabric to shape
Area	on table
Type	decision
Effect	-

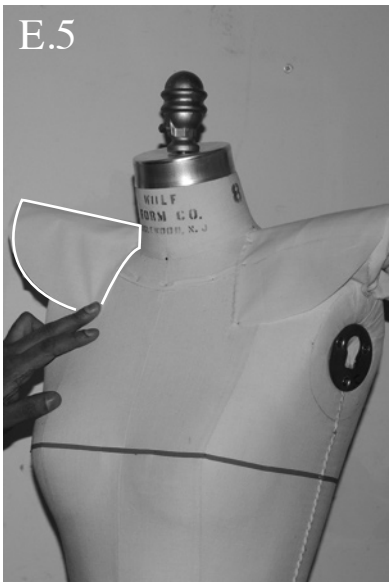
E.3

Action	pins fabric to form
Area	left shoulder
Type	decision
Effect	creates shoulder piece

E.4

Action	stuffs muslin under shoulder piece
Area	above left shoulder
Type	decision
Effect	adds volume to shoulder

E.5

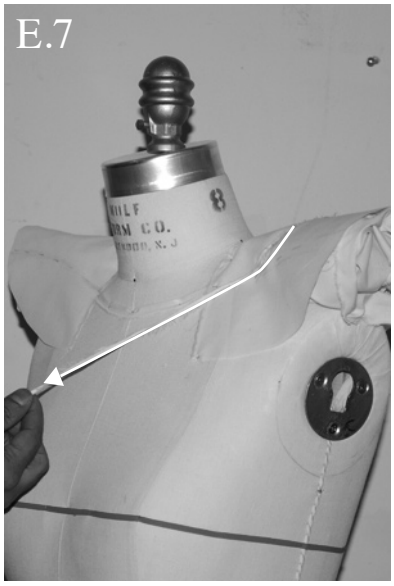


Action	repeats #4-5 on right side
Area	right shoulder
Type	decision, reflection of #4-5
Effect	mirror symmetry of #3-4

E.6

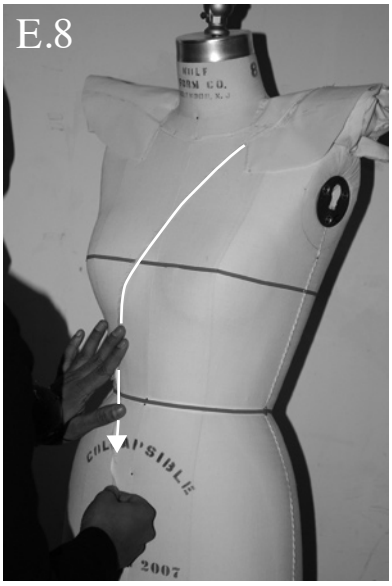
Action	pins tape to form
Area	from right shoulder
Type	decision
Effect	creates neckline

E.7



Action	continues to pin tape to form
Area	LR diag. across chest
Type	decision
Effect	creates LR diag. line

E.8

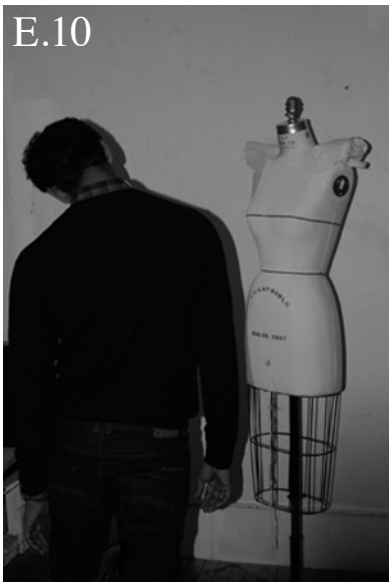


Action	continues to pin tape to form
Area	vert. down right front
Type	decision
Effect	diag. line changes to vert.

E.9

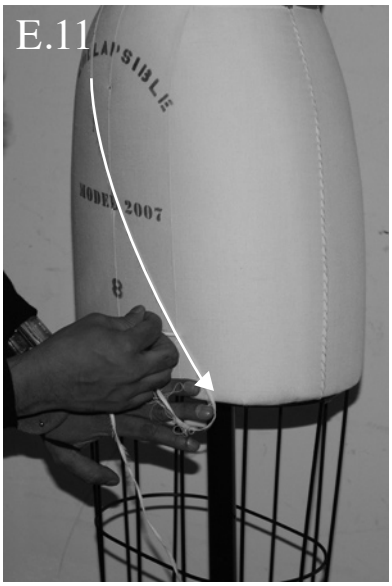
Action	continues to pin tape to form
Area	vert. down right front hip
Type	decision
Effect	continuation of vert. line

E.10



Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

E.11

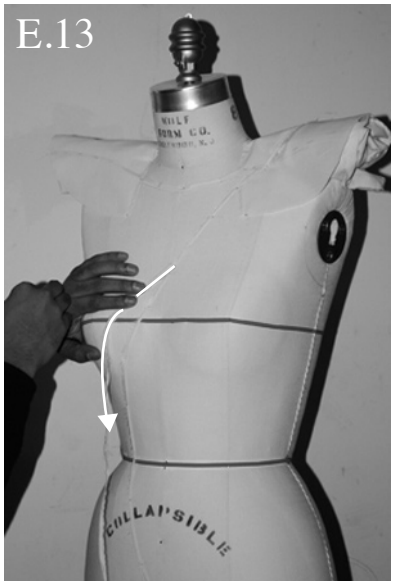


Action	continues to pin tape to form
Area	RL diag. from right hip to left thigh
Type	decision
Effect	creates RL diag. line

E.12

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

E.13

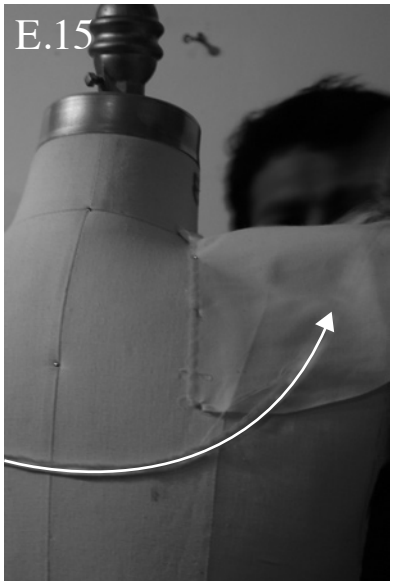


Action	pins new tape line, originating from #7-9
Area	from CF chest to right bust
Type	decision
Effect	repeats LR diag. (#7)

E.14

Action	continues to pin tape line to form
Area	vert. down waist to right hip
Type	decision
Effect	repeats vert. (#8)

E.15



Action	pins new tape line to form
Area	back, from left shoulder to right shoulder
Type	decision
Effect	similar neckline to front

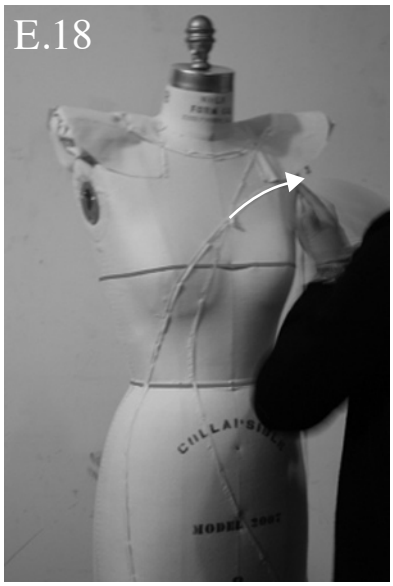
E.16

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

E.17

Action	stepping back farther
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

E.18

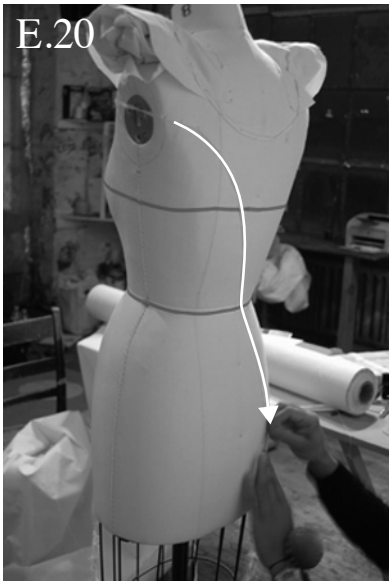


Action	continues tape line as RL diag.
Area	from CF to left shoulder
Type	decision
Effect	continues LR diag.

E.19

Action	continues tape line to back of form
Area	left shoulder to left back
Type	decision
Effect	connects front to back

E.20



Action	continues tape line down back, LR diag.
Area	from left shoulder to right hip
Type	decision
Effect	line mirrors front

E.21

Action	measuring distance from tape line to side
Area	CF to SS
Type	tuning
Effect	measuring to cut fabric

E.22

Action	new fabric layer (muslin)
Area	front
Type	decision
Effect	repeat of fabric from shoulder pieces

E.23

Action	pins fabric to form
Area	right shoulder
Type	decision
Effect	fabric falls from shoulder

E.24

Action	pins fabric along tape line
Area	front neckline
Type	decisoin
Effect	creates neckline using tape line (#6)

E.25

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

E.26

Action	pins fabric at bottom of shoulder piece
Area	right shoulder
Type	decision
Effect	connects to shoulder piece

E.27

Action	cuts overlapping fabric
Area	right shoulder
Type	decision
Effect	creates seam

E.28

Action	pins fabric to bottom of shoulder piece
Area	left shoulder
Type	decision, reflection of #27
Effect	connects to shoulder

E.29

Action	cuts fabric along tape line
Area	left shoulder
Type	decision
Effect	creates seam

E.30

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

E.31

Action	waist dart
Area	from right bust to waist
Type	decision
Effect	fabric fitted to waist

E.32

Action	stepping back
Area	whole garment
Type	evaluation
Effect	balance of semi-completed garment as whole

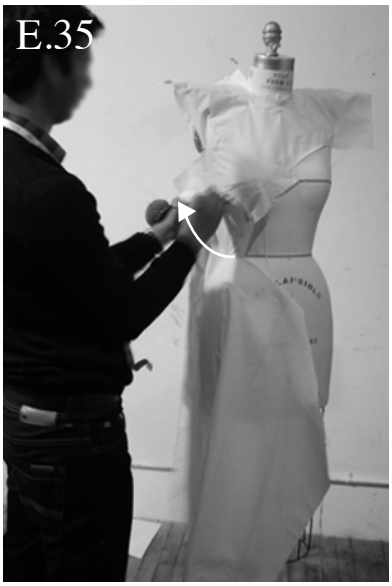
E.33

Action	clips fabric along waistline
Area	front waist
Type	tuning
Effect	fabric fitted to waist

E.34

Action	unpins and flattens dart from #31 at waist
Area	front waist
Type	idea testing
Effect	creates flat front

E.35

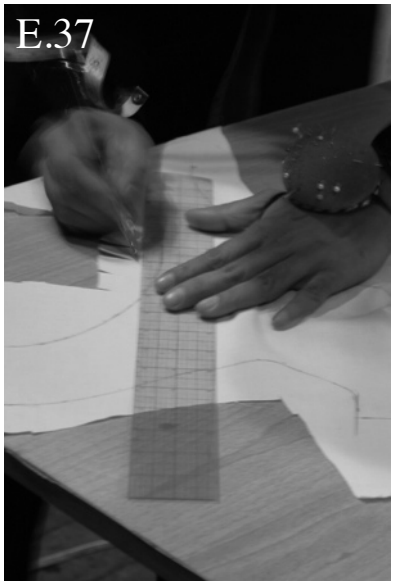


Action	moves dart to side bust
Area	from front waist to left SS
Type	decision, alters #31
Effect	eliminates seamline on front

E.36

Action	pins fabric to SS, clips excess and traces all tapelines
Area	right SS
Type	decision
Effect	creates left SS

E.37



Action	removes fabric from form and re-traces seam lines
Area	on table
Type	tuning
Effect	truing seamlines

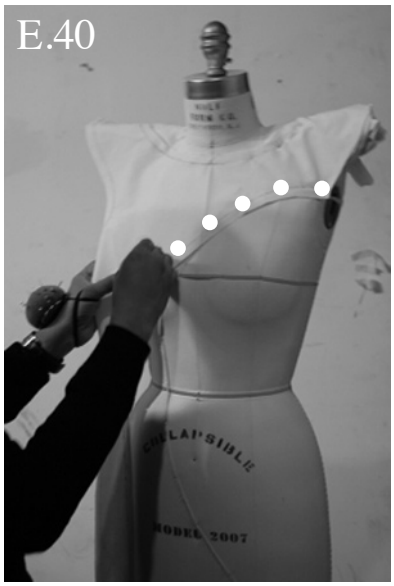
E.38

Action	trims excess fabric outside seam lines of pattern piece
Area	on table
Type	tuning
Effect	establishing seamlines

E.39

Action	pins refined pattern piece to form
Area	right and left shoulders
Type	tuning
Effect	creating pattern piece

E.40



Action	pins fabric along tape-line
Area	left shoulder to right bust
Type	tuning
Effect	creates seamline

E.41

Action	continues to pin fabric along tape line
Area	from waist, down right thigh
Type	tuning
Effect	continues seamline

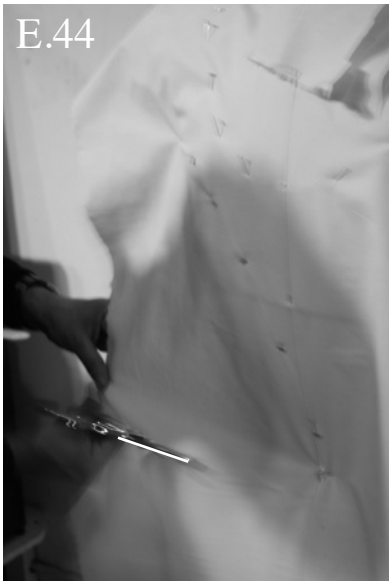
E.42

Action	adds new fabric layer (muslin)
Area	back
Type	decision
Effect	continues fabric from front

E.43

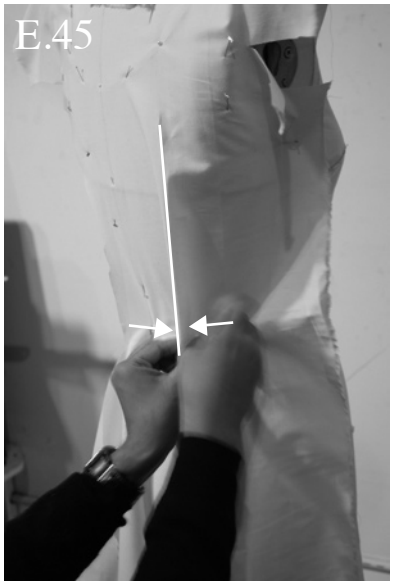
Action	pins fabric along tape line
Area	upper back from right shoulder to left shoulder
Type	decision
Effect	pins neckline at tape

E.44



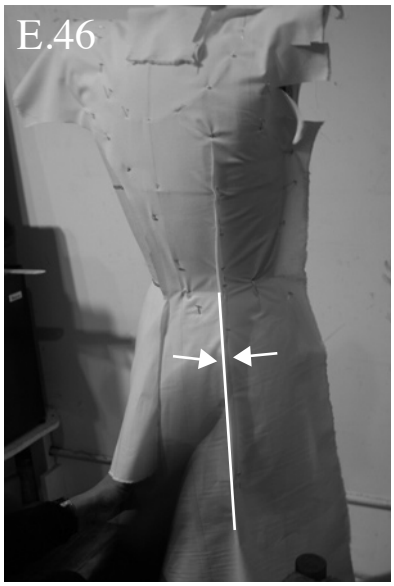
Action	cuts excess fabric out-side of pins
Area	back
Type	tuning
Effect	creates smaller surface

E.45



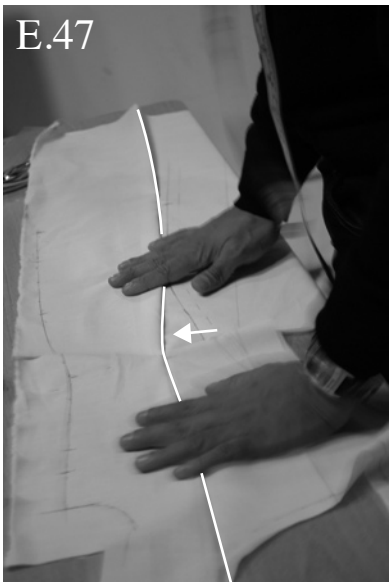
Action	removes excress fabric at waist by creating a dart
Area	left back at waist
Type	decision
Effect	fabric fitted at waist

E.46



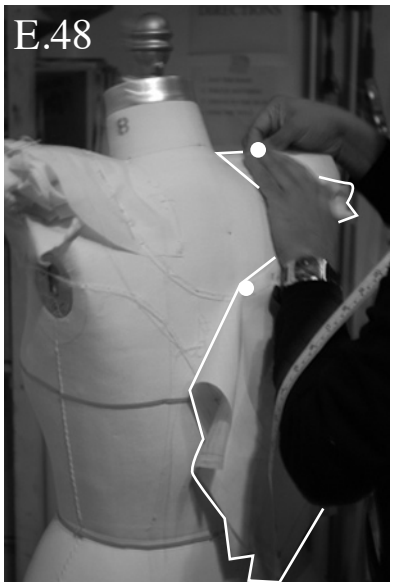
Action	removes excess fabric by continueing dart
Area	left back, from waist to thighs
Type	decision
Effect	fabric fitted through hips

E.47



Action	removes fabric from form and re-folds the dart
Area	on table
Type	tuning
Effect	creates seamline

E.48



Action	re-pins fabric to form
Area	back
Type	tuning
Effect	creates pattern piece

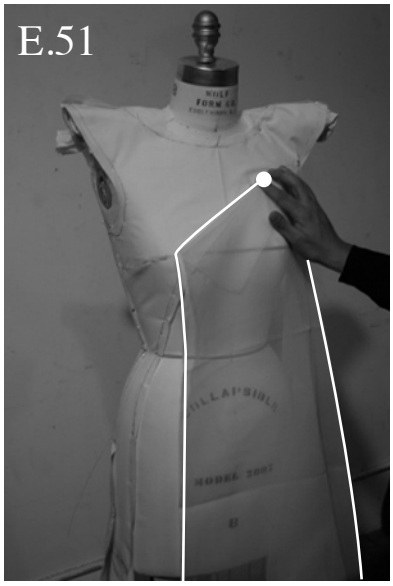
E.49

Action	cuts excess fabric
Area	from CB waist
Type	tuning
Effect	creates seamline

E.50

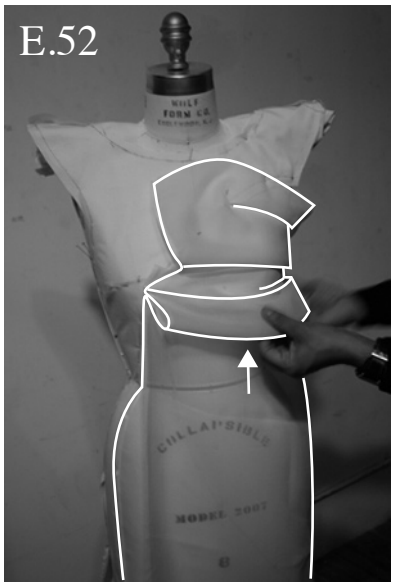
Action	adds chiffon fabric
Area	front
Type	decision
Effect	contrast in fabric opacity and surface

E.51



Action	pins fabric to form
Area	from left shoulder
Type	decision
Effect	contrast in volume (fitted vs. loose)

E.52



Action	pleats fabric horiz.
Area	from left SS to tape line
Type	decision
Effect	contrast in surface texture

E.53

Front view of garment at the end of the draping session

5.7 Design Participant F

5.71 Design Process: Source of Inspiration

"I've always had an interest in Egyptian costume, culture, and decoration. I like the ornate details, the collars, the gathering..."
(Audio file 2.1, 49:53-50:28)

"I don't feel like I'm collecting all those little details, but I was inspired by them."
(Audio file 2.1, 50:42-50:58)

"When it's an inspiration that's broad, you just draw. But, when its specified, I think you try to control it a little bit more because you want people to see what you saw."
(Audio file 2.1, 1:05:24-1:05:49)

"A theme [is something] that I can relate to, I'm comfortable working with, mimicking, or using as inspiration. There's so much in Egyptian culture and history. You become really familiar with the costuming or cultural wear. I felt like I could interpret that easier than any of the other ideas"
(Audio file 2.2, 3:14-4:21).

5.72 Design Process: Translation

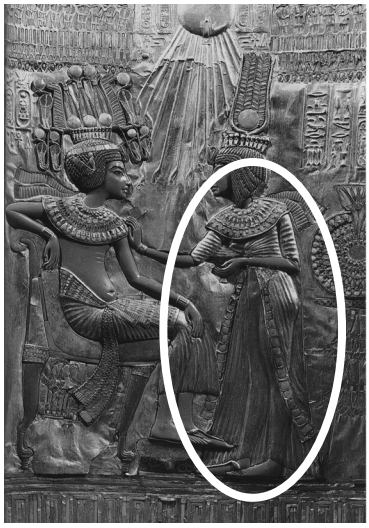


"I noticed a lot of drapery, gathering, and what the people were wearing..."
(Audio file 2.1, 52:20-52:38)



"I took the belted look from the guy's wardrobe."
(Audio file 2.1, 53:58-54:16)

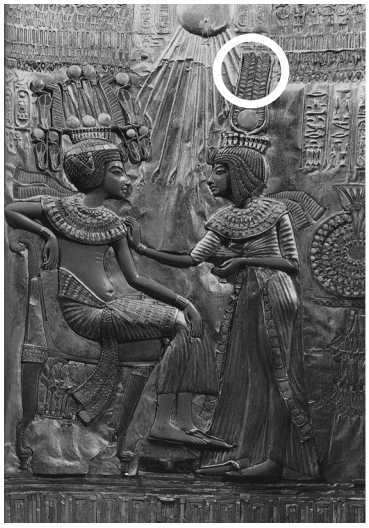
"[I had] also drawn a belt or a sash, and did some gathering, so took the elements from several drawings, plus the picture."
(Audio file 2.2, 0:00-0:36)



"I wanted to do a longer dress because the woman was wearing something really long..."
(Audio file 2.1, 53:58-54:16)



"[I wanted] to take some details that would be recognizable. The first one was the circular collar detail…."
(Audio file 2.1, 51:42-51:56)



“There was kind of fish-tail chevron in the background that had a lot of detail that was good to use for sketching and for gathering.”
(Audio file 2.2, 0:36-1:06)

5.73 Design Process: Sketching

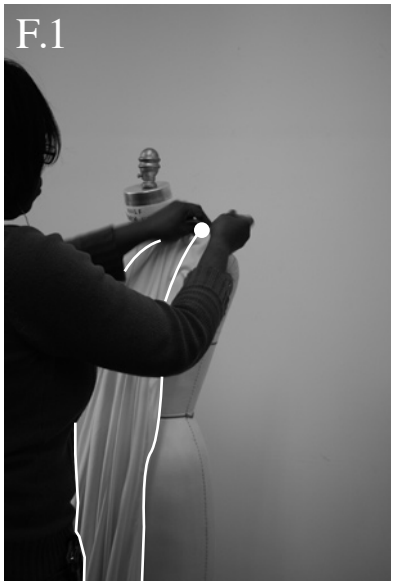
This designer participated in the sketching session, completing five full-figure croquis.

5.74 Design Process: Draping

This designer did not choose a specific garment as the basis for her draped design, but did use the same source of inspiration.

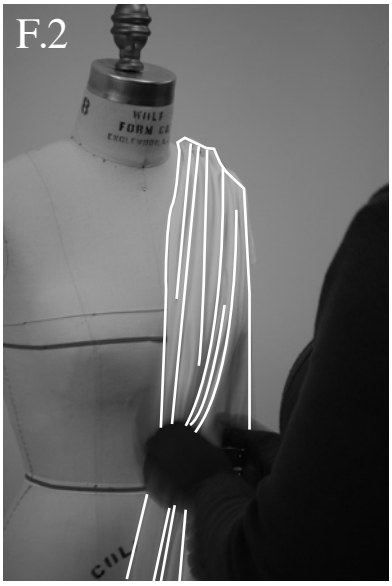
> "I do more draping. I enjoy draping more. I'll drape, change it to flat pattern, and then make a paper pattern. I don't like to use patterns first."
> (Audio file 2.2, 6:40-7:03)

F.1



Action	first fabric layer (jersey)
Area	left shoulder
Type	decision
Effect	asymmetrical garment

F.2



Action	gathering
Area	CF waist
Type	idea testing
Effect	continuation of shoulder gathers

F.3

Action	spreading
Area	front bustline
Type	idea testing
Effect	covering the bust, flat surface contrasts gathers

F.4

Action	gathering
Area	CF waist
Type	idea testing
Effect	repeats shoulder gathers at waistline

F.5

Action	spreading
Area	front waist
Type	idea testing
Effect	repeat of idea #3

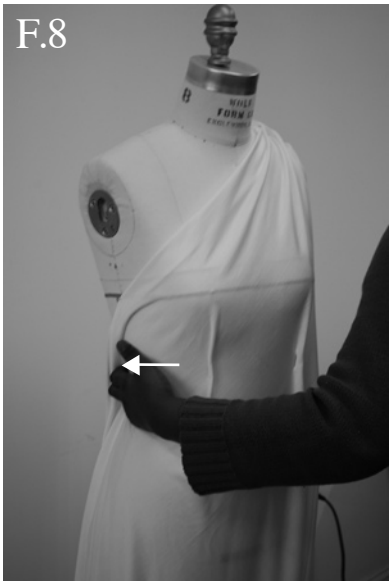
F.6

Action	creating dart
Area	front right waist
Type	decision
Effect	fitted at waist

F.7

Action	creating dart
Area	front left waist
Type	decision
Effect	reflection of #6, creates symmetry in contrast to asymmetry

F.8



Action	smoothing
Area	toward right SS
Type	tuning
Effect	bodice viewed as grouped whole

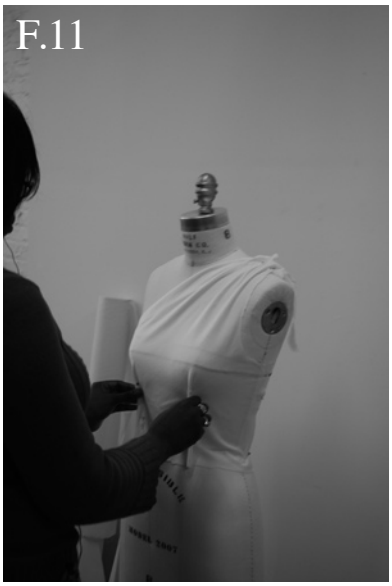
F.9

Action	cutting
Area	left SS
Type	decision
Effect	creates left SS

F.10

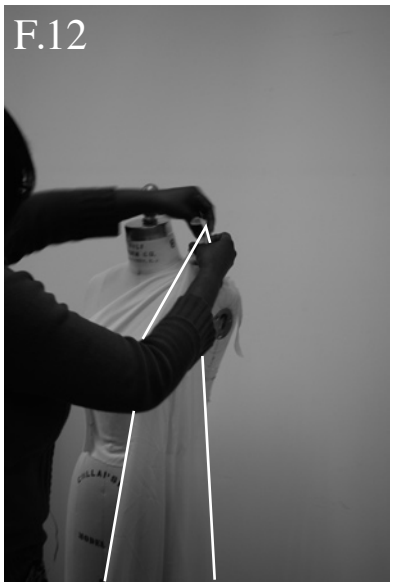
Action	cutting
Area	waistline
Type	decision
Effect	creates waistline seam

F.11



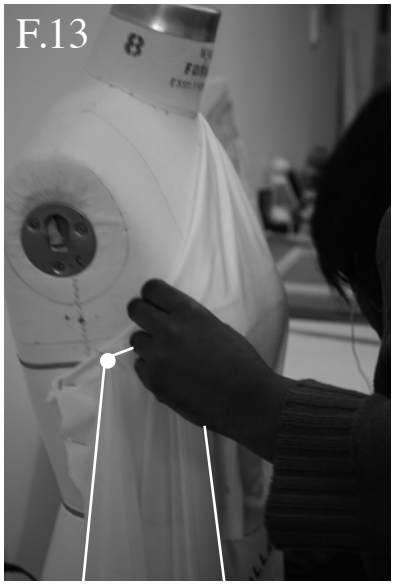
Action	adjusting darts
Area	front torso
Type	tuning
Effect	bodice viewed as grouped whole

F.12



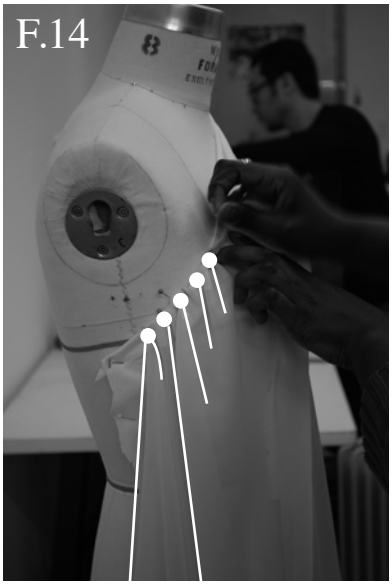
Action	new fabric layer (chif-fon)
Area	left shoulder
Type	idea testing
Effect	contrast in fabric opacity and construction

F.13



Action	pinning new fabric layer
Area	from right SS
Type	decision
Effect	movement of fabric layer from shoulder to bustl

F.14

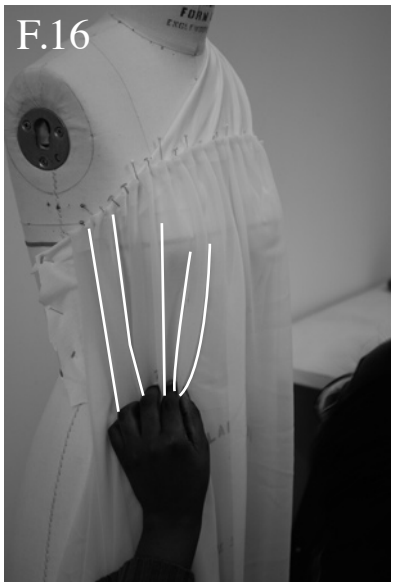


Action	plea ting
Area	from right SS, over bust
Type	decision
Effect	pleats refer to shoulder gathers, change in line direction

F.15

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.16



Action	pleating
Area	waist
Type	decision
Effect	continuation of pleats from #14 to waistline

F.17

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

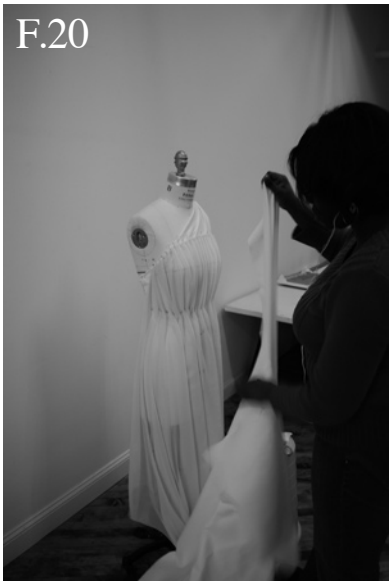
F.18

Action	adjusting gathers
Area	left shoulder
Type	tuning
Effect	bodice viewed as grouped whole

F.19

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.20



Action	new fabric layer (woven stretch silk)
Area	-
Type	decision
Effect	contrast in fabric construction and surface

F.21

Action	creation of belt
Area	across hips
Type	idea testing
Effect	diagonal of asymmetrical neckline repeated on hips with angle change

F.22

Action	tieing belt
Area	right front hip
Type	idea testing
Effect	accents hips, repeats diagonal on neckline, vertical on pleats/skirt

F.23

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

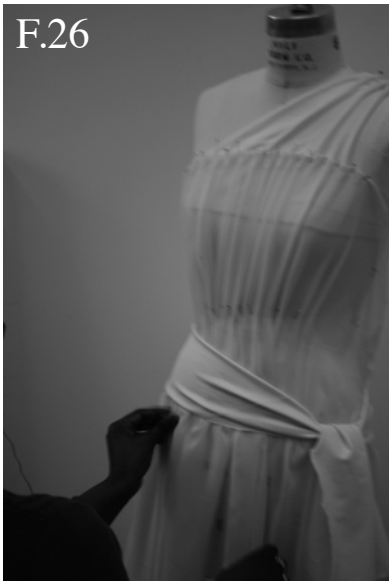
F.24

Action	reversing belt direction
Area	across hips
Type	decision
Effect	reflection of idea #21

F.25

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.26

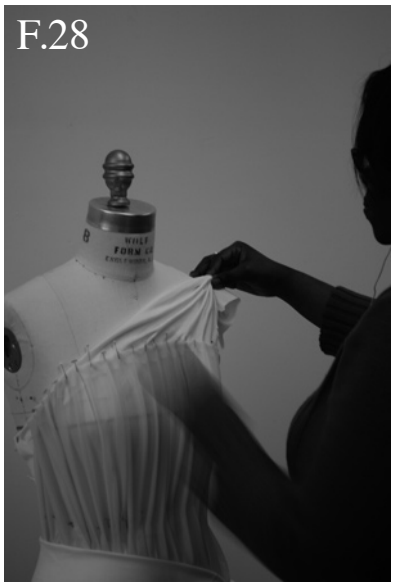


Action	adjusting gathers
Area	skirt, under belt
Type	tuning
Effect	evens spacing of gathers below belt

F.27

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.28



Action	adjusting gathers
Area	left shoulder
Type	tuning
Effect	evens spacing of gathers from shoulder

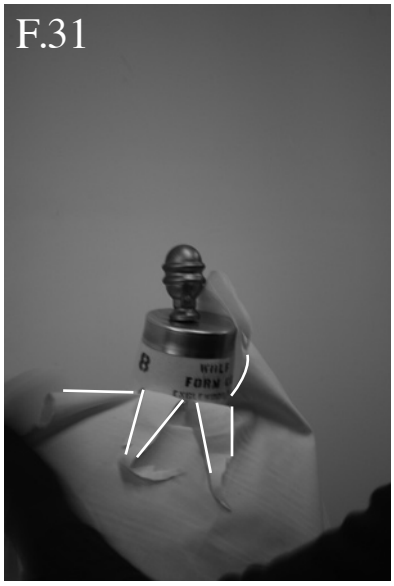
F.29

Action	new fabric layer (muslin)
Area	-
Type	decision
Effect	constrast in fabric construction and surface

F.30

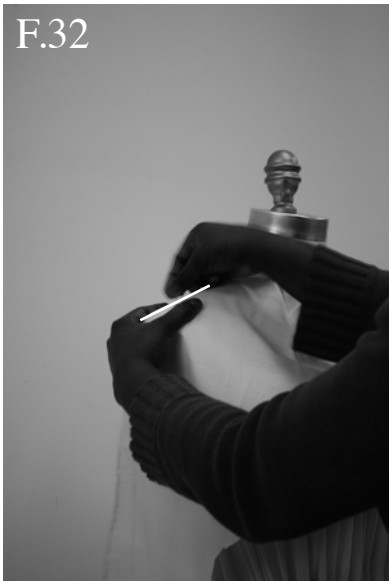
Action	pinning fabric to form
Area	across shoulders
Type	decision
Effect	contrast in fabrics, symmetry contrasts asymmtry from shoulder

F.31



Action	clipping
Area	around neckline
Type	decision
Effect	allows fabric to lay flat on chest

F.32



Action	pinning shoulder seam
Area	right and left shoulder
Type	decision
Effect	creates shoulder seam

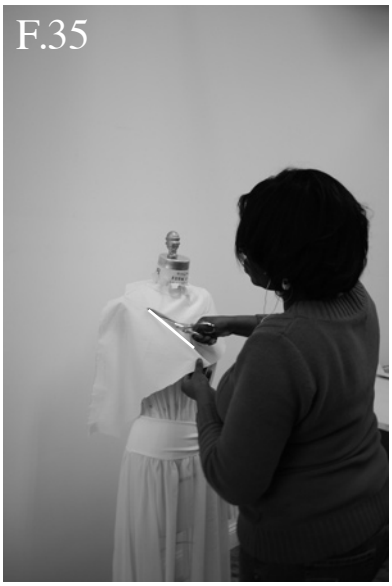
F.33

Action	tracing seamline
Area	neckline and shoulders
Type	tuning
Effect	truing seams

F.34

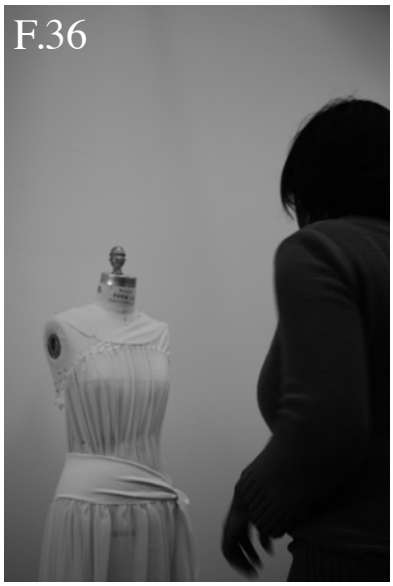
Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.35



Action	cutting
Area	from shoulders
Type	decision
Effect	creates circular edge, contrasts rectangular shapes

F.36

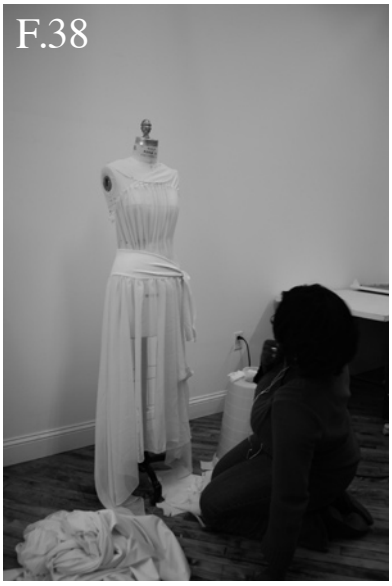


Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.37

Action	testing hemline length
Area	at knee
Type	idea testing
Effect	shortens hem

F.38



Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

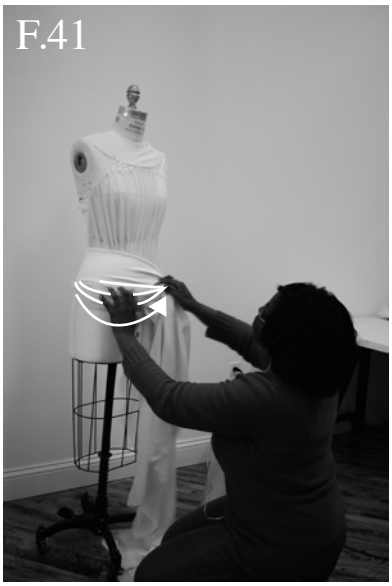
F.39

Action	pinning skirt fabic up to belt
Area	low hip
Type	idea testing
Effect	vertical gathers become curved, referring to neck

F.40

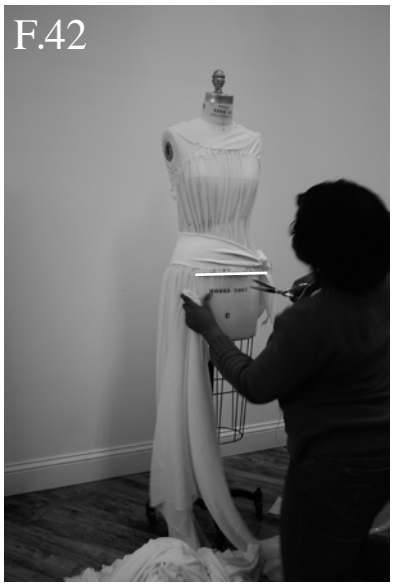
Action	gathers skirt fabric together
Area	CF
Type	idea testing
Effect	vertical gathers become circular, adds volume

F.41



Action	gathering skirt fabric toward knot on belt
Area	from right hip to left hip
Type	idea testing
Effect	gathers follow line of belt

F.42

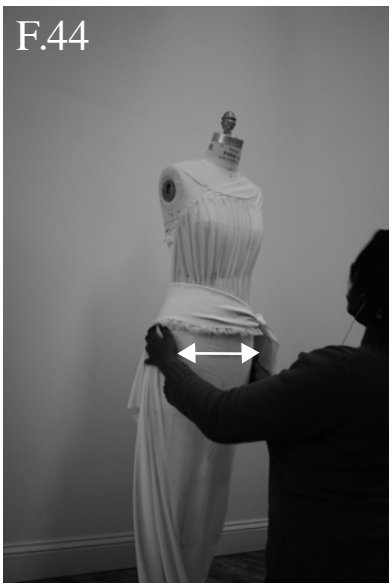


Action	cutting
Area	low waist, below belt
Type	decision
Effect	removal of skirt fabric

F.43

Action	new fabric layer (jersey)
Area	across hips, covering legs
Type	idea testing
Effect	repeat of fabric in #1, neckline line repeated

F.44

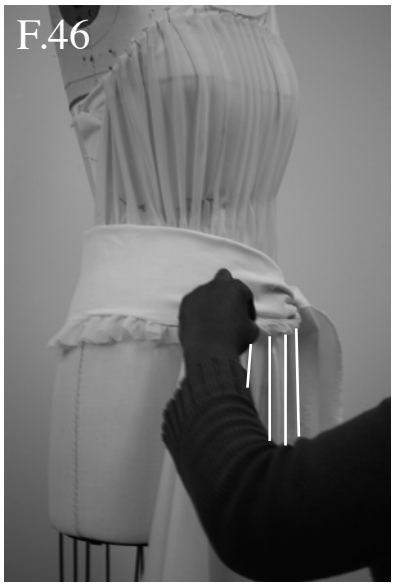


Action	smoothing skirt
Area	from CF toward hips
Type	idea testing
Effect	flat surface repeats neck-piece and belt, contrasts gathers/pleasts

F.45

Action	lowering of fabric
Area	right hip
Type	idea testing
Effect	diagonal line repeats neck, contrasts belt

F.46



Action	knife pleating
Area	skirt, under belt
Type	idea testing
Effect	repeat of pleats on bod-ice, increase in size

F.47

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

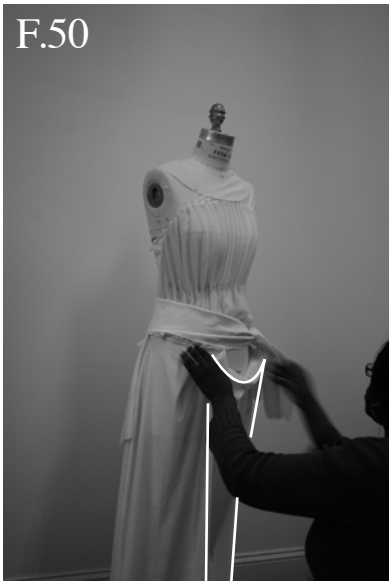
F.48

Action	adjusting pleats
Area	skirt
Type	tuning
Effect	evening vertical line of pleats

F.49

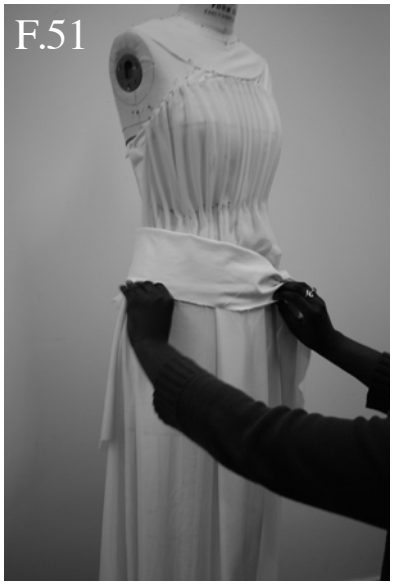
Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.50



Action	box pleat
Area	front skirt
Type	decision
Effect	change in pleat type and size

F.51



Action	adjusting belt
Area	across hips
Type	tuning
Effect	moving belt from behind to over top of skirt

F.52

Action	testing hemline length
Area	at knee
Type	idea testing
Effect	repeat of idea #37

F.53

Action	cutting
Area	hemline
Type	decision
Effect	creates hemline

F.54

Action	adjusting belt
Area	left hip
Type	tuning
Effect	moves the hanging part of the belt slightly

F.55

Action	stepping back
Area	whole garment
Type	evaluation
Effect	semi-completed garment seen as whole

F.56

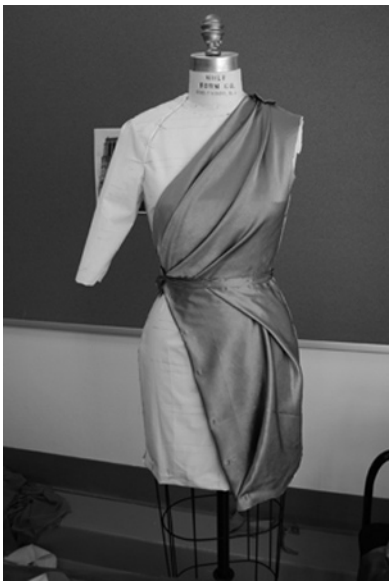
Action	tieing belt
Area	left hip
Type	tuning
Effect	adjusting the belt's gathers and hanging pieces

F.57

Front view of garment at the end of the draping session

5.8 Final Garments for Each Designer

5.81 Original Photos



Design Participant A

Design Participant B

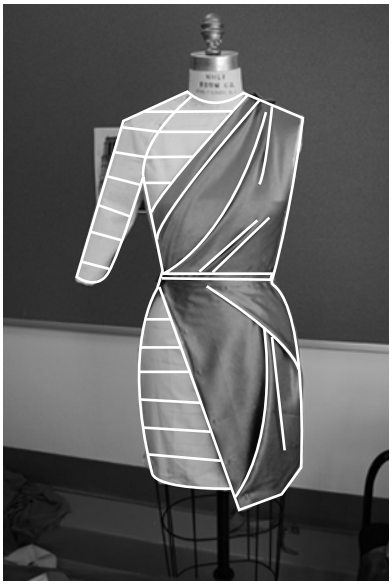
Design Participant C

Design Participant D

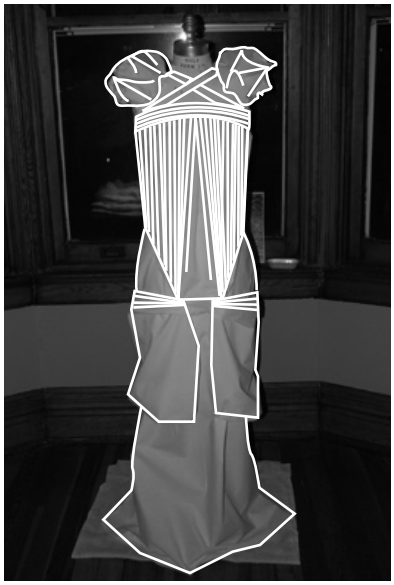
Design Participant E

Design Participant F

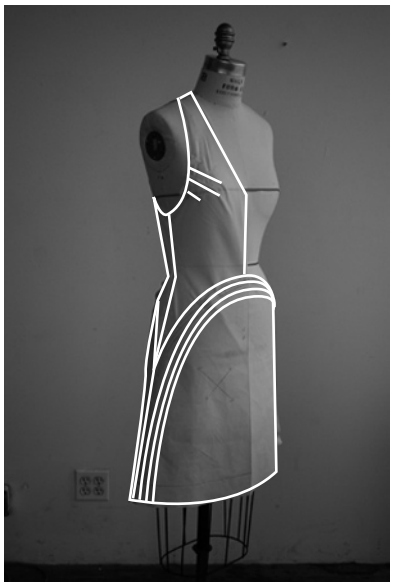
5.82 Photos Showing Silhouette and Line



Design Participant A

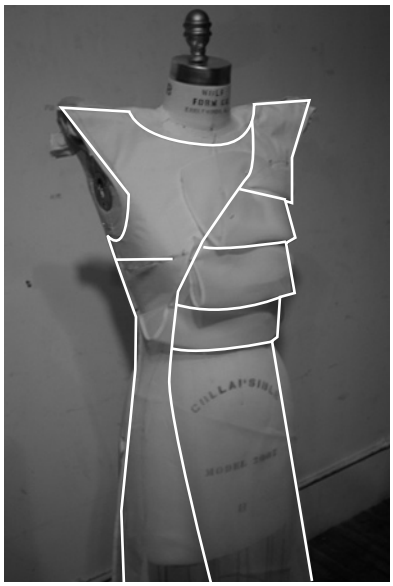


Design Participant B



Design Participant C

Design Participant D



Design Participant E

Design Participant F

Chapter 6

DISCUSSION

6.1 Introduction

This chapter is divided into three main categories for discussion: Methodological Insights, Creative Design Process Insights, and Draping Process Insights. These are followed by the Future Study section which highlights areas of interest that may provide worthwhile research paths in the future, and concludes with the Summary to review key observations.

6.2 Methodological Insights

6.21 Designers Difficulty in Verbalizing the Design Process

All six designers varied greatly in their ability to verbalize their design processes. Some designers were eager to discuss their design process and needed very little prompting, while other designers needed to have answers drawn out of them using very specifically pointed questions and constant probing for clarification or elaboration on short, often vague answers. The interview for Designer C fit the latter description, therefore, his response when asked if it was difficult to speak about the design process was surprising. He simply, and confidently answered "No" (Audio file 6.1, 7:36-7:50). However, it is important to note that English was a second language for Designer C, and compared to the other designers, he had the most difficulty communicating. To contrast, some designers, such as Designer A, had more insightful understandings of their own design process. Designer A was able to verbalize insights more clearly than the other designers. He provided lengthy answers in response to each question and would discuss many

topics within each answer with very little prompting. He appeared to have a clear understanding of his design process, but was still not able to completely answer all of the questions asked. For example, when discussing contrasting design elements, he was asked to specifically identify what it was in his design that tied those contrasting elements together. He laughed and answered, "It just happens, I don't know. It's just so difficult to pinpoint exactly" (Audio file 1.3, 5:10-5:25). Later, he was asked to clarify how it was that a garment began to "look good" to him, and his response was, "But there are no words to describe why it starts looking good" (Audio file 1.3, 5:30-7:08).

Other designers also referred to this difficulty in verbalizing a visual process. Designer D was trying to describing her desire to "make the fabric more curved" (Audio file 3.1, 3:00-3:48) and stated, "It's hard to describe it without using my hands to draw it" (Audio file 3.1, 3:00-3:48). Many of the designers also referred to the difficulty in describing the mental processes associated with design. For example, when asked to clarify exactly what she meant by her design "morphing," Designer F responded by laughing and saying, "It's so funny to talk about what's in your head" (Audio file 2.2, 9:00-9:38). Later, when asked if she found it difficult to talk about "what's in your head," she said, "yes…it's really a mental process that just happens" (Audio file 2.2, 10:58-11:41). Also, when Designer E was discussing the design process being one of evolution he stated, "You have a look that you want, and that's what's in your head" (Audio file 5.1, 6:15-6:50).

The responses given by the designers support the theory that the design process contains mental processes that are not easily translatable into a verbal explanation. However, it is still unclear if this inability to articulate is a lack of ones own conscious understanding of what is happening, a lack of verbal words to describe a visual process, or both. The evidence from this

research supports the need to allow multiple research methods to gather information on design processes, importantly, observation and verbal data collected retrospectively. The Protocol Analysis (Simon & Newell, 1972) method is asking designers to perform a difficult, if not impossible, verbal translation simultaneously while performing the mental operations necessary for design activity. These conflicting mental activities hinder the focus of the research, which is the natural unfolding of the design activity itself.

6.22 Action Type Categories

		A	*B*	*C*	*D*	*E*	*F*
Draping Action Type (number of occurrences and % of total)	***Decision***	27 (67.5%)	22 (52%)	22 (52%)	56 (63%)	34 (65%)	18 (32%)
	Tuning	6 (15%)	3 (7%)	18 (43%)	4 (5%)	10 (19%)	10 (18%)
	Idea Testing	3 (7.5%)	5 (12%)	0 (0%)	19 (21%)	1 (2%)	16 (29%)
	Evaluation	4 (10%)	12 (29%)	2 (5%)	10 (11%)	7 (14%)	12 (21%)

(Table 1)

Through observation and analysis of the design processes of these six designers, four categories of designers actions were identified and described as Action Types. The categorization and recorded frequency of action types provides a new way of looking at and comparing design process strategy. For example, the action of decision, which was identified retrospectively as critical decisions leading to the outcome of the product, was the most frequently identified for all designers. Compared to all the other designers, Designer A had the highest overall percentage of decisions, followed closely by Designers E and D. Designers B and C also had relatively high percentages of decisions, while Designer F had a very low percentage of decisions when compared to the other designers. In her post-design interview, Designer F referred to decisions, such as cutting the fabric, as risks that bring forth new opportunities and ideas. She stated,

"I know why I'm editing or choosing to cut something, but it's really somewhat of a risk actually, because I may not like it after I cut it, but I have to cut it to see what the next option could be, what the next idea it might bring. So, it's also a process to help you generate even more ideas, a continuing process."

(Audio file 2.2, 10:58-11:41)

It is possible that her low percentage of decisions is related to her perceived risk in making them. It is interesting to note that this designer had much higher percentages of idea testing and evaluation compared to the other designers, which could be attributed to the low percentage of decisions and the self-described apprehension toward risk.

In the other action type categories, designer C exhibited the most extreme percentages of tuning, evaluation, and idea testing occurrences. Of all of the designers, he had the highest percentage of tuning and the lowest percentage of evaluation and no idea testing. This was the only instance where a designer exhibited no instances in an action type category of idea testing, and it could be attributed to the fact that he completed the design of the garment in the previous sketching session. Of all of the designers, even those that created collections and sketches previous to draping, his garment showed the least amount of change and no new design ideas between the original sketch and the draped garment. Designer A exhibited moderate percentages of tuning and evaluation and a low percentage of idea testing. Similar to Designer C, this could be attributed to low percentage of idea testing to his creation of the sketch during the design sketching session. If one were to examine the sketching session of these designers more closely it would be interesting to note the evidence and frequency of idea testing as part of the development of the sketches.

Compared to all the other designers, Designer F had the least amount of variation in the

percentages between her action types, showing the lowest percentage of decision by a significant amount, the highest percentage of idea testing, the second highest percentage of evaluation, and a moderate percentage of tuning. When viewing the draping process as a whole, this designer not only engaged in idea testing more frequently that the other designers, but would also test multiple ideas for the same areas of the body sequentially (for example, images F.39-F.41 and images F.43-F.46), and frequently evaluate the ideas she had tested. Also, at certain points she appeared to be testing ideas borrowed from every sketch in the collection created prior to beginning the draping process. For instance, it appears that the gathered bust area from sketch #3 was translated into the final draped garment, but during the draping process this designer also tested the skirt idea from sketch #3 (image F.40). In her post-design interview, she had stated her two design strategies are to "just flow with it and then see what happens....as well as stepping away when it gets frustrating" (Audio file 2.2, 15:57-16:50). These preferred strategies explain her high percentage of both idea testing and evaluation.

Designer D exhibited the second highest percentage of idea testing, behind Designer F. In comparison to the other designers, the evaluation stage of Designer D occurred moderately while the tuning stage occurred with the lowest percentage of all.

Compared to all of the designers, Designer E exhibited a moderate percentage of tuning and evaluation, and a low percentage of idea testing. The low percentage of idea testing is interesting due to the importance placed on "playing" with the fabric during the post-design interview. The designer spent much of the allotted time determining style lines, which can be attributed to the low percentage of idea testing. At the end of the time limit much of the garment was still left unfinished, and it appears that the unfinished sections of this garment would be where the most idea testing and "playing" would have taken place, had this designer been able

to continue over multiple sessions. All of the areas he left unfinished in the sketch also remained unfinished in the final draped garment. If he were able to continue, it would be interesting to see the changes between the draped garment and the sketch.

The categorization of action types is a new way of revealing insight into designer's individual strategies. For example, high percentages of idea testing, such as with Designer F, or a high degree of evaluation, such as with Designer B, may consistently be a part of these designer's strategies. Also, instances with low percentages of a certain action type, such as no idea testing in the case of Designer C, may also help to form an understanding of these designers' particular strategies. Multiple sessions of design research with the same designer would be necessary to confirm or deny these claims.

6.3 Creative Design Process Insights

6.31 Designers Interest in the Source of Inspiration

	A	***B***	***C***	***D***	***E***	***F***
Source of Inspiration	Notre Dame	Notre Dame	Notre Dame	Gaudi	Guadi	Egyptian chair

(Table 2)

Of the five inspiration images provided, three (Notre Dame, the Egyptian chair, and Gaudi building) were the only images selected by the six designers. Each designer identified certain features within the inspiration that led them to select a certain image to use those features as an influence for their own design.

The image of Notre Dame was the most popular source of inspiration selected. Designer's A, B, and C all chose this image. Designers A and B pointed to many of the same elements as inspiration from the Notre Dame image. Both designers stated in their post-design interviews

that they were inspired by the ornate door hinges, the circular the rose window, and the row on statues on the building. However, Designer A identified the round shape of the window as the inspiration, while Designer B indicated the details within the rose window as being the source of inspiration. Designer A identified a grid-like component, as well as a rectangular component as being derived from the inspiration. Designer B and C identified the asymmetrical draped garments on the statues as being part of the initial inspiration. Designer C also identified the arched shape above the doorways as an important inspiration element, which was not identified by either of the other two designers.

The Gaudi building was the second most popular image, with two of the six designers choosing this one as the basis for their design. Designers D and E both chose this image. Designer E stated in the post-design interview that he was looking for details that grabbed his attention, and he specifically pointed to the line of the balcony and the line of the roof as important elements in the inspiration image, while Designer D stated that there was "a lot to draw from" and that the building was "kind of crazy and quirky" with "amorphous shapes, which I thought that translated to fabric" (Audio file 3.1, 0:20-1:00). Designer D also indicated that having the inspiration image as a starting point helped to initiate her design process by stating, "If there had been no inspiration I think it would have really hard to just drape something. When you have no parameters" (Audio file 3.1, 11:52-12:07). Designer A, who did not choose this inspiration image said in response to the Gaudi building that, "I don't see clothes from it. It's too shocking for me. I like things a little bit more austere" (Audio file 1.2, 16:18-20:00). Both designer's D and E identified the line of the roof from the Gaudi building as inspiration, and both designers stated they saw the roof as being unbalanced, in a way that they both stated as being composed of structured versus unstructured elements. However, Designer D indicated inspiration was derived

from the organic shape and lines, while Designer E stated this inspiration translated to a rigid versus a sheer structure. Both Designer's D and E also identified the shape of the balconies as part of their inspiration. Designer D also identified the shape of the turret as a source of inspiration, which appeared her to be "sculptural" (Audio file 3.1, 1:00-1:37).

Designer F chose the image of the Egyptian chair as her inspiration to begin the design process. She identified "an interest in Egyptian costume, culture, and decoration," along with "the ornate details, collars, and gathering…" (Audio file 2.1, 49:53-50:28). Designer D, who did not choose this inspiration, stated, "The word "Egyptian" was appealing, but then when I looked at the images I felt like the chair was very rigid and it was more about the ornate hieroglyphics, and I didn't really know how to translate that into 3D fabric" (Audio file 3.1, 1:37-2:11). Designer F chose to focus on the details, specifically from the garments of the figures, as inspiration, while Designer D was focused on the overall structure and "rigid" feeling, both in the shape of the chair as well as in the detail of the figures. Designer F chose to primarily borrow within-domain elements, or the fashion design details, from the garments of the figures in the image, while all of the other designers seemed to translate their inspiration from something between-domain, or not directly related to clothing such as the rose window. In fact, Designer D stated that she did not choose inspiration images that contained people because she "felt like the ones that had people in them were a lot harder because the clothing had already been designed" (Audio file 3.1, 2:11-2:35).

All of the sources of inspiration could be considered between-domain sources, however, Designer F, drew inspiration only from the garments on the figures, then would be categorized as a within-domain source of inspiration. With Designer F, some of the design elements from the source of inspiration were applied to the draped garment almost exactly as they appeared

on the garments of the figures in the inspiration image. The other garment design details were borrowed with some repetition and some change. It is necessary in design to have the ability to look at a within-domain source, in this case another garment, and extract details that could be used in new ways or in new combinations for a new design. The ability to see novel applications across domains is also an important aspect to creative thinking in general. Although there is no known research on how the inspiration domain selection correlates to the ability of the designer, it is clear that the selection of a between-domain source of inspiration requires a higher degree of abstract and creative thinking than the selection of a within-domain source of inspiration.

It was much easier for designers to identify *what* was selected from the source as opposed to *why* it was selected. Many designers referred to the design elements of line direction and shape or form, and sometimes design principles, such as repetition. Although not stated specifically by any of the designers, it was clear that the most influential features selected from the source of inspiration were those that contained a combination of elements or principles. For example, if a designer was only inspired by a vertical line, they would have stated as such, but these designers pointed to features such as the row of statues in the Notre Dame, which contains the element of vertical lines (created by each statue), but also the principle of repetition, which combined together create an overall rectangular shape and a strong horizontal line. In this example, there are both contrasting elements, as well as elements contained within other elements, or multiple layers of elements. Herbert Simon (1996) described design as "boxes within boxes." It is evident in their explanations that these designers were looking for not only contrasting design elements (or principles), but also design elements (or principles) within elements (or principles). Forming combinations is critical to creative thinking, and this research has shown evidence that designers are searching for combinations, and multiple layers of combinations, of elements or

principles in the source of inspiration.

6.32 Additional Influences to the Design Process

In addition to the source of inspiration, designers were influenced by other factors, including the design of their current industry collections (as stated by Designer A) and the current marketplace trends. For example, Designer E stated in the post-design interview his desire for the shoulders to be "a little bit dramatic, because of trend. Shoulders are trending right now, and this obviously hits the trend. This is a perfect example of how this sleeve should look" (Audio file 5.1, 9:25-10:05).

Certain designers referred to their design process being influenced by a perceived target market. For this research, the study description did not suggest any specific target market for their design, but allowed each designer to proceed in their own way. Designer D referred to the freedom she felt in not being restricted to a specific target market, while Designer A stated that he needed to define a target market in order to design, and struggled in the beginning of the sketching session to come up with a target market. This designer described the importance of the target market identification by stating, "I am a New York designer, so it's about marketability and it's very sales driven. It has to be somewhat commercial and a niche, whatever the niche is" (Audio file 1.2, 2:15-3:39). In reference to the target market he stated, "[The only difficulty was] the identification of the girl at the beginning... then once I did it was just easy" (Audio file 1.1, 31:50-32:49). Designer A stated that he is "generally inspired by a woman and her lifestyle… I can take elements from art or architecture or other designers, but for the most part I'm inspired by a woman" (Audio file 1.1, 0:00-1:18).

6.33 Notable Design Elements and Principles

Symmetry

Although the principle of symmetry was not identified by any of the designers who chose Notre Dame as their source of inspiration (Designers A, B, and C), it is important to note that all three draped designs contain a strong sense of symmetry, either formal or informal. In the image of Notre Dame, the architecture appears symmetrical left to right. Two out of the three designers that chose this image also produced a garment that also appears symmetrical left to right (Designers B and C), and although the third (Designer A) did not, he did refer to a "grid-like" feature that inspired him from the source inspiration. The perceived symmetry of an inspiration image can be an important design element that translates across domains.

Only two of the garments are symmetrical left-to-right (B and C), and the rest appear asymmetrical. However, all of the asymmetrical garments are balanced by symmetrical details. Asymmetrical design elements, such as the form of draped garments on the statues on the building's façade, were identified by Designers A and C as being part of the initial inspiration. Since designers are searching for combinations, especially those which are contrasting, symmetry and asymmetry are an obvious combination in fashion design. Since the body (symmetrical left to right but not front to back) provides a basis for the design, the resulting garment will always be in some sort of symmetrical or asymmetrical combination with the body as well as itself.

Contrast

Contrasting elements are important aspects borrowed of the source of inspiration, and were referred to by many of the designers. For example, both Designers D and E chose the source of inspiration image of the Gaudi building, and referred to the contrast in material and

texture seen on either side of the roof line, although this inspirational element translated into their garments in vastly different ways. Designer D used only one fabric and primarily created contrasts of line (straight lines and curved lines as well as contrasts in line direction) and volume (fitted areas toward the body and areas of volume away from the body). Designer E stated that his design intention was to "mix [the sheer pleats] around the structure" (Audio file 5.1, 0:15-2:34), and in viewing the final garment, one can observe this contrast in fabric, a woven cotton muslin and a sheer woven silk, as also providing a contrast in line (straight lines and curved lines), both in the form of seam lines as well as the exterior lines created by the form, contrasts in surface (opaque and sheer surfaces), contrasts of texture (flat areas and pleated areas), and contrasts of form (fitted areas and areas of volume). The seam line on the front (images E.7-E.11) which continues on the back (images E.19-E.20) appears to be a dividing line for all of the contrasts in the garment. Interestingly, the line of the roof in the Gaudi building creates this same effect.

Other examples of contrasting elements are the fabric (lace and satin), surface texture (matte lace and shiny satin), surface structure (gathered areas and flat areas), and line (predominately horizontals and varying degrees of diagonals) in the garment created by Designer A, as well as the line (strong verticals and horizontals), surface (flat surfaces and gathered or pleated surfaces), and form (circular shapes and rectangular shapes) of the garment created by Designer B. Designer F's use of many different fabrics leads to a greater amount of contrast in surface appearance and fabric structure. To further enhance this contrast of materials, this designer stated in the post-design interview that muslin fabric she used for the collar was actually intended to be "either a metal form or a chintzed fabric that looks like armory" (Audio file 2.2, 5:08-6:40). The use of an even more structured material for the collar further enhances a contrast of hard and

soft materials. The addition of chiffon also creates a contrast between opaque materials and the translucence of the chiffon. In addition, line contrasts in the garment created by Designer F can be seen as primarily vertical and diagonal, however the collar adds a curved and horizontal line contrast. Since this garment is primarily fitted to the form, there is not a significant difference in volume away from the body. The greatest contrasts in form appear as shapes within the silhouette of the body, and the lines created by the edges of those shapes. The body of the dress can be viewed primarily as rectangular, while the collar appears circular and the neckline and belt appear triangular.

Balance

Although never referred to directly as balance, many of the designers explained the need for it in their design or their collection using various terms. Designer F referred to this sense of balance as "calm within a collection" (Audio file 2.2, 17:40-18:40), and Designer E referred to balance as "simplifying" (Audio file 5.1, 9:25-10:05) what he considered dramatic or overpowering. Designer A also referred to a sense of balance in a design when he described "mixing things… in a way that isn't too jarring" (Audio file 1.3, 4:26-4:40).

Designers exhibited awareness of the need to balance a garment from left-to-right, top-to-bottom, and front-to-back. Designers would often move back and forth between these sections in an effort to balance the garment, either formally or informally. For example, the garments created by Designer B and C are symmetrical from left-to-right, so the primary movement to achieve balance is between the top and bottom sections of the garment, which are not symmetrical in this orientation.

Designer F first completed the bodice section of the dress, from top-to-bottom, and then

completed the skirt portion, from top-to-bottom, only once returning to the bodice section to add the collar detail (images F.30-F.35). It is clear that the body form is viewed as being primarily segmented at the waistline, or in this case, the dropped waist below the belt, and that this designer is working to connect the elements both within and between those two body sections. The design was only completed on the front of the body and stops at the side seams.

Most designers (A, F, B, and C) worked primarily in these typically defined sections of the body form where seam lines are normally present: Right (and left) side bodice front, right (and left) side bodice back, right (and left) side hip and leg front, right (and left) side hip and leg back, right (and left) sleeve. However, Designers D and E (who both chose Gaudi as their source of inspiration) created newly defined areas of the body. Designer E created these subsections by dividing the dress form with style tape along the curves of the body. Even though there were side seams, the garment did not appear to break in continuity at those points, as the designer paid special attention to connecting the front and back sections as a whole through details such as continued interior seam lines (images E.18-E.20). Designer E was the only designer to use style tape, and his use of style tape shows his intended use of seam lines as a design detail of the garment, in addition to a structural or fitting consideration. These curved interior seam lines follow the lines of the body, making it necessary for the lines to be marked on the body form and before the addition of any fabric.

Designer D worked primarily in a succession of small fabric layers, slowly building the design around the starting point at the right bust and radiating downward. While there was a distinct progression from top to bottom, this designer, more than any of the others, exhibited a frequent shifting between the left and right side of the body as she worked her way downward building up design details and alternating with tuning. This left-to-right shifting indicates a

strong desire for balance in a garment that appears to be more asymmetrical than symmetrical. Because the overall design was not pre-determined by a sketch this shifting was also necessary to balance the progressing design in smaller increments as she built up the details to form a finished garment. When this designer moved from the bodice to the skirt portion, there are indications of not only the left-to-right balance but also top-to-bottom balance as well. Both left-to-right and top-to-bottom balance is achieved primarily through varying line direction and volume. For example, this designer has created volume away from the body in the bust area, progressing to a fitted section at the waist, and then progressing outward again away from the body from the waist to the skirt hem. To observe the direction of the line in the same manner, the line converges in toward the waistline and then outward toward the hem.

Repetition

Repeating elements can be seen from the source of inspiration to the final garment, as well as details that are repeating within the final garment and in observation of the creation of the garment. For example, Designer B's repetitive elements appear primarily as line and shape or form. Vertical lines, both in the pleating (images B.4, B.6) as well as the overall rectangular form of the garment (image B.41), are contrasted by horizontal lines, on the neckline banding (image B.18) and hips (image B.35), and diagonal lines, inside the shoulder pieces (image B.10), across the chest (image B.42), and on the top (image B.26). These lines are created both by the overall shape, as well as lines within the shape, in this case it is primarily by pleating. The large box pleat on the skirt (image B.4) is altered both in size (from one large to many small) and technique (from box pleating to knife pleating) when applied to the top (image C) as opposed to the skirt. The horizontal pleating on the neck band (image B.18) and hip area (image B.35) does not

change in size or technique when compared to the pleating on the top, but does change in direction (from vertical to horizontal). The pleating detail should be considered a repetitive element, even though every instance of repetition involves some aspect of change. The repetition in shape or form can be seen most clearly by the rectangular forms, first in the skirt (image B.2), then on the top (image B.8), then on the neck band (image B.18), then on the hip pieces (image B.38-B.39), and finally on the straps across the chest (image B.42). The rectangular shape is repeating, but always with a change in size.

The most notable repetition of design elements in the garment created by Designer C appears as groupings of three. There is a set of three darts around the armscyes, before being changed to two darts on the backside for fitting considerations, and a set of three seam lines along the arch shape of the front and back skirt.

Combination

Many designers in the post-design interview referred to the importance of the combination of elements, both in their selection from the source of inspiration, as well as the creation of new combinations. For example, Designer A spoke of the importance of combining elements in his design process. He stated, "I try to bring, almost always, more than two elements together. [In this design it was] the hard, which is the satin, the soft, which I was hoping would be the chiffon, and the lace which was bringing a type of body suit thing, which is what she's wearing underneath" (Audio File 1.2, 8:24-9:10). He also referred to this combination of elements as "ways of mixing things together…. I was just kind of regurgitating it" (Audio file 1.3, 2:40-2:56) as well as figuring out "how to put [the elements] together in a way that isn't too jarring" (Audio file 1.3, 4:26-4:40).

Designer F also stated that she liked "to mix things... "(Audio file 2.2, 19:19-20:14), and it appears that the most important decisions in her draping process were which elements to borrow from the inspiration and/or sketches and how these elements would be combined in new ways to form a new, complimentary garment to the existing collection. However, she stated that she was careful about which elements to include and exclude because she wanted to avoid "putting all your ideas into this one drape. You have to be able to edit yourself" (Audio file 2.2, 9:00-9:38). In addition, Designer E stated, "I tend to simplify in the end. If it is looking too much, I don't want to make it...something dramatic" (Audio file 5.1, 9:25-10:05). As stated previously, this need to 'simplify' or 'edit' refers to the balance of a garment. Designer E also described an understated tone in his design, choosing to veer away from something that he described as dramatic. Using different terms, this could be described as the design principle of emphasis.

6.34 Notable Design Strategies

6.341 The Whole and Its Parts

Some design processes, Designer E for example, may start with the whole, or one could say 'big picture' approach, and then work to fill in the parts, or design details, while other design processes, Designer D for example, begin with the details and then build on those details to complete the whole. In her post-design interview, Designer D referred to a strong association of Gaudi's building as being "sculptural," as well as her own association between draping with sculpting. She stated, "With draping, for me, I don't want to draw anything out. I just want it to be sculptural, however the fabric lands and however it forms to the body. I feel like Gaudi's buildings are kind of crazy. Sort of fluid and it looks like he built on wherever he felt like adding things" (Audio file 3.1, 1:00-1:37).

The overall strategies may be different, but in both processes similarities exist in the constant shifting between viewing the details and viewing the garment as a whole. In addition, the action type of 'evaluation' by the designer clearly shows when a designer evaluates their design, usually by taking a few steps back after working closely to the form. Evaluation of the design, no matter the state of the design's completion, is the designer viewing their design as a cohesive whole, rather than a detailed part. By observing design process in detail we are able to note when these actions take place, and form ideas as to each designers particular strategy.

6.342 The Importance of Play

Play is an important aspect to creative thinking, and many of the designer who participated in this study referred to what they considered a playful or fun aspect of designing. When considering a future design decision after the completion of the draping process, Designer A stated, "I'd have to play and experiment" (Audio file 1.2, 1:52-2:15). When also considering a future decision, Designer E stated, "You have to see, and you have to play with it" (Audio file 5.1, 4:40-4:58).

Similarly, Designer B stated in review of one of her design decisions that she "just wanted to play with it a little bit" (Audio file 4.1, 2:40-3:02). In addition, Designer D chose to use only the muslin fabric, and appeared to be focused on experimenting with the shapes and forms created by the muslin fabric, which she described as "playing" with the fabric on the form. She stated, "I was playing with it...that's why I didn't want to draw anything. I feel like that's really draping" (Audio file 3.1, 3:48-4:35). These references to play indicate the designers desire to test ideas, and can be clearly seen in the observation photographs during the 'idea testing' action type.

6.35 Design as Continuing Process

Although there was a set time limit for this draping process, it is clear that in any design process there cannot truly be a set beginning and end. The current or previous experiences of the designer affect the way in which she or he designs, some of which can be identified, but many of which could not. Many of the designers concluded their own draping sessions ahead of the allotted time. Only one, Designer E, used the entire time slot and stated that he did not have enough time to reach a state of completion. However, all designers referred to how design is always a work in progressed and never truly complete.

In the evaluation of his final garment, Designer C stated, "I'm not very happy with [the center front neckline].... maybe I could change it. After I drape, I prepare the paper patterns, and I could change this on the paper pattern" (Audio file 6.1, 2:42-3:20). Even though he made a significant change to the neckline during the draping process, he was still not satisfied. He also commented about the proportion of the skirt to the body by stating, "[I would raise the hemline] maybe three inches" (Audio file 6.1, 3:20-3:52).

Designer E showed enthusiasm about the draping process, and even when the time limit had expired, he discussed in detail the further direction of the garment if the session were to continue, and he even offered to take the unfinished garment home and complete it at a later time. For instance, because of the time limit, he was unable to complete the circular shapes that appear along the front seam line in sketch. He described his plans for this design detail as, "I was thinking of soft gauze as the circles. Not volume, flat, but it has some volume. Like when you put batting in and it gets a bunched up look. That's what I wanted to create in that area…" (Audio file 5.1, 0:15-2:34). Also due to the time limit, the pleats on his garment remained unfin-

ished but he later stated an intention for them to gradiate in size from top-to-bottom. He stated, "I want to have smaller pleats [near the top] and as you move down I want them to be bigger and bigger and bigger, so that there is more fabric at the end point [hem]" (Audio file 5.1, 2:40-3:23). He was very specific as to the technique and application of the pleats, stating, "First I'm going to lay down the entire fabric, then pleat it, then drape it on the form so it is transparent on this side..."(Audio file 5.1, 3:23-3:54), and, "this pleat is not going to be stitched in, this pleat is going to be here on the waist" (Audio file 5.1, 8:15-9:09). He also described future plans for other aspects of the garment, "I am planning to shift this dart [on the front bust]... It's going to be one piece…and there will be a seam here [at the side seam], so that she can get in, and there will be no shoulder seam, just a flat piece of fabric" (Audio file 5.1, 8:15-9:09). As stated before, all of these intended additions to the garment would be dependent on "how the fabric reacts" (Audio file 5.1, 3:54-4:40)

Designer F stated that for her design "would always be a work in progress, because [later I might] see that I should add something or now it doesn't relate to something...I can go back and edit" (Audio file 2.2, 13:07-13:49). Designer A also stated that his design process "evolves slowly throughout" (Audio file 1.1, 16:28-16:59) and that "It is never really finished until its finished. I could probably keep going" (Audio file 1.1, 18:16-18:41). All of the designers, after ending the draping session, continued to evaluate their design and suggest future changes that they would make to the design. The design process is continuous, and it is difficult to pinpoint both the beginning and the end.

6.4 Draping Process Insights

6.41 Translation of Inspiration to Garment Design Details

Both Designers A and B stated in their post-design interviews that they were inspired by the ornate door hinges in image of Notre Dame, however, Designer A stated that the hinges on the door immediately translated into lace fabric, while Designer B stated that the hinges translated into a small appliqué pattern. Designers A and B also pointed to Notre Dame's rose window as inspiration, and in my opinion, both designers translated the rose window as a round shape with interior pleats, but changed the scale, volume, and position on the body. When asked about the relationship between the rose window and the shoulder pieces, Designer B identified both the circular shape of the rose window as well as the lines within the circular shape as being translated. She stated, "The rosette comes in [at the shoulder pieces]. It was both [the circular shape and the pleating within the circle]" (Audio file 4.1, 1:36-1:48). The shape of the window was directly borrowed by Designer B, and the lines within the circular shape were translated into pleats. Designer A created asymmetrical pleats within a rounded area on the hips, while designer B created symmetrical pleats inside of a circular, voluminous shape attached to the shoulders. For Designer B, the round shape also translated to 3D volume. Designer's A and B also both also identified the row on statues on the façade of Notre Dame as inspiration, but Designer A stated that this feature translated into a belt (which appears as an almost exact miniature of the row of statues), while Designer B stated that this feature translated into vertical, repeating pleating applications, borrowing only this combination of elements from the source. Designer B also identified the elaborate door hinges as translating into an appliqué addition on the fabric's surface. However, this detail cannot be observed on the final garment, which she referred to as "just stage one" (Audio file 4.1, 4:12-5:22), because it would have been intended as an application to the garment's final fabric, which would have been physically added at a later stage.

Although not identified or acknowledged by the Designer B, there were also rectangular

shapes, both in the overall form as well as in the two small sections on the skirt. This strong rectangular shape contrast the circular shape, and was most likely also borrowed from the source of inspiration, since the contrasting rectangular shape can be clearly seen in both the doors and the bell towers. Also, in addition to the vertical pleating that was identified by the designer as derived from the inspiration, she also created horizontal pleating, both on the neckline band as well as on the left and right hip areas of the skirt portion. Although not stated by the designer, it is evident that this horizontal pleating was created both to contrast the vertical pleating as well as to mimic the horizontal banding effects that can be observed on Notre Dame's façade. Designer A referred to observing a "grid-like" effect on the façade of this building, and although this was not mentioned by Designer B, that the strong horizontal and vertical components of her design could be interpreted as exhibiting the same grid pattern.

Designer C also identified the arched shape above the doorways on Notre Dame's facade as an important inspiration element, and it was stated by Designer C in the post-design interview that the arched shape directly translated into the shape of the skirt portion of the draped dress. The three nested style lines that repeat the seam of the skirt portion were also derived from the arch of the doorway. Designer C stated that he "made some seam lines like this arch" (Audio file 6.1, 0:43-1:23). Although not directly stated by Designer C, it is interesting that Designer C used certain details in combinations of three (the darts around the front and back armscye as well as the style lines on the front and back skirt) and that the arched doorways that were stated as being part of his inspiration appear in a combination of three, suggesting that designers translate details into their garment but do not always recollect where that detail originated from.

Designer D identified the line of the roof from the Gaudi building as an important inspiration. She indicated inspiration was derived from the organic shape and lines, which was trans-

lated into the use of primarily asymmetrical shapes and lines. This designer specifically identified three features of the building (the turret, the balcony, and the roof line) as directly inspiring her design. These design elements did not appear to be translated directly, but more abstractly, as general ideas about curves and forms, which would take on different shapes in the fabric than on the building. She stated in the post-design interview that she did "look back [to the source of inspiration] a couple of times, and then I looked at my dress and thought that it didn't really look that much like the source of inspiration. After a certain point I didn't really care. I didn't want it to look like you were wearing an architectural building…I think its ok to veer off from the original inspiration" (Audio file 3.1, 9:37-10:09).

Designer E also identified the line of the roof as an important inspiration, and stated that this inspiration translated to a rigid versus a sheer structure. Evidence of this interpretation by Designer E can clearly be seen in the use of a flat, fitted, muslin area contrasted by a pleated chiffon area. Although this designer did not state it directly, it appears to me that the seam line along which these two fabrics meet reflects the line of the roof as well. To compare the initial sketch with the inspiration image, one can see an almost exact translation of the lines and forms from the image of the roof line to the sketch (the large circular shapes increasing in size from the left shoulder, and the contrast of flat surface on the upper left side of the body and the textured surface on the lower right side of the body). It is clear that this detail was enlarged and applied directly to the body form, but the specific garment details remained unfinished so that they could be determined later during the actual draping process, most likely through idea testing had the designer had more allotted time.

Both Designer's D and E also identified the shape of the balconies as part of their inspiration. Designer D stated that she was considering constructing this same shape by creating curved

fabric using piping, cording, or rolled fabric. Image D.9-D.10 in the draping process clearly shows this designer rolling the fabric and applying it to the bust area of the form. Designer E did not specifically state how this inspiration translated into the form of the garment, but it is clear that the shape of the shoulders and neckline are derived from this shape. Designer D also identified the turret as a source of inspiration, which appeared her to be "sculptural" (Audio file 3.1, 1:00-1:37). She also compared her general design process for this draped garment to sculpting, and chose only muslin fabric to use to drape.

Designer F chose the image of the Egyptian chair, as the inspiration for her design process. Although this image would at first appear to be between-domain, this designer primarily was inspired by elements of "what the people were wearing" (Audio file 2.1, 52:20-52:38). For this reason, her source of inspiration should be considered primarily within-domain, borrowing design elements from existing garments and applying, with or without change, to the new garment design. It appears that most of the design elements from the source of inspiration were borrowed directly without change, or with only some change, and incorporated into the sketched collection. Similarly, the design elements in the draped garment appear to be borrowed directly from inspiration as well as the sketches. This draped garment could be incorporated well as the sixth garment to the sketched collection. In the post-design interview this designer stated in reference to her draped garment that she was "looking for a feeling. ...not necessarily more complicated but just more interesting. It could be building from the first [sketched design] and making sure that it relates to the inspiration. It's more of a feeling, if I feel like it was cohesive" (Audio file 2.2, 13:49-15:13). She confirmed that the draped garment was related to both the sketches as well as the inspiration. When discussing in more detail what made a collection cohesive, she stated, "Its easy to draw things that look similar and that have a similar feeling to them and call

it a collection, but I wanted to make sure it's not just similar, I want it to be the sister of the last design, so different, but from the same family" (Audio file 2.2, 15:13-15:57). She did not elaborate on what exactly constituted a "sister" design in her opinion, but this would be an interesting concept to explore in further detail.

Designer F stated in the post-design interview that she specifically borrowed the "belt or sash" (Audio file 2.2, 0:00-0:36) from one of the figures as well as the "circular collar" (Audio file 2.1, 51:42-51:56) form that appears around the neckline of both figures. These design elements appear in her draped garment exactly as they appear on the garments of the figures carved into the chair. For this reason, the form of these two elements is borrowed directly, without any apparent change. She also refers to the gathering detail, and the length of the dress as inspiration for her design. When comparing the draped design to the garments of the figures in the inspiration image, the gathering detail appears in both, but with change in direction of line and form from the original inspiration. The gathering on the garments of the figures in the inspiration is small in size, loose on the body, and appears to be oriented more horizontally and diagonally on the figures, apart from the skirt portion of the woman's garment in the inspiration, where the gathering appears the more vertical in orientation. The top portion of this designer's draped garment shows small gathers that appear vertical in orientation, and fitted to the body form. The size of the gathers did not change, but there is observable change in the orientation and fit to the body. The gathering applied to the top portion at first continued down the body in the form of a long skirt (image F.19), but the skirt portion was eventually cut away (image F.42) and a new jersey fabric layer was introduced as the skirt portion, and pleated (image F.46). The original gathers on the skirt were changed in form to knife pleats, reduced in number and increased in size. After an evaluation at this point in the design process (image F.49), the designer once again

changed the form (from knife pleats to a single box pleat), further reduced the number to one, and further increased the size of the pleat (image F.50).

Initially, the length of the dress was long (image F.19), the same as the inspiration image, but was eventually cut to a shorter hemline. Image F.37 shows the first observable consideration to shorten the hemline when the designer folds the fabric slightly to test the hemline length. She then removes the skirt (image F.42), and then replaces it while keeping the same length (image F.43). Image #52 shows, once again, the testing of a shorter hemline of the same length as image F.37, and a final decision to cut the fabric to accommodate this new hemline (image F.53) .

As evident from this research, designers are searching for features in the source of inspiration that can provide them with combinations of design element or principle, often appearing in a layers. These combinations are not always initially identified from the source of inspiration, but may appear as new insights as the designer refers back to the source of inspiration. Designer D stated that she did not return to the source of inspiration after initially viewing it, but many of the other designers did refer back to the source of inspiration at multiple points throughout their draping process to look for new information that they could apply to their draped garment. Many designers identified some of the same features from their respective sources of inspiration; however, the translation into garment details was almost never the same. Designers both repeated and translated design details with varying degrees of change. The least amount of change occurs when a detail is repeated from a within-domain source almost exactly (such as the collar shape, size, and location in the draped garment of Designer F), and the most change occurs when a detail is abstracted from a between-domain source and applied to a new domain (such as the rectangular bell tower becoming a sheath dress in the garment of Designer A). When comparing the final draped garment to the source of inspiration, it is sometimes obvious and sometimes dif-

ficult to identify exact lines or shapes that appear to repeat between the inspiration image and the draped garment. Difficulty in identifying relationships indicates a more abstracted relationship between the design elements in the inspiration and the design elements in the draped garment. Any between-domain inspiration must be abstracted to a certain extent in order for it to be translated to an apparel garment, but it is still possible to borrow certain elements in a more direct fashion, such as the curve of a line of the roof in the Gaudi building translating to a seam line in the dress of Designer E. For Designers D and A, these direct relationships are harder to identify in comparing the source of inspiration and the garment, most likely indicating an increased level of abstraction.

6.42 Translation of 2D to 3D: The Relationship of Sketching to Draping

		A	***B***	***C***	***D***	***E***	***F***
Sketching	***Material(s) Used***	Pencil, colored markers	_	Pencil	_	Pencil	Colored markers
	Results	17 initial sketches, then a final collection of 6 taken from the initial	_	Collection of 10 flat sketches	_	One unfinished croquis	Collection of 5

(Table 3)

Although not a requirement, some designers chose to participate in a tandem research project conducted on designer's sketching processes that took place prior to beginning the draping study. The three designers that participated (A, C, and F) all exhibited very different sketching processes to create a collection. Designers A, F, and C all sketched a full collection,

but completed this process in a variety of ways. Designer A chose to sketch 17 pencil sketches, some full-figure and some unfinished, and then proceeded to choose 6 of those sketches to re-draw with marker as full-figure croquis to compose the final collection. Designer F did not draw initial sketches, but just began immediately with five full-figure colored croquis. Designer C also did not draw initial sketches, but immediately began the final collection. This designer did not use colored markers, but drew 10 flat sketches with pencil to compose the final collection. The designers that sketched a collection were asked to create a minimum of five garments, and this designer obviously drew twice as many for his collection. Designer E did not sketch a full collection, but quickly drew one croquis sketch prior to beginning his draping process. Designer E stated that he drew the sketch, but didn't "know what I was going to do with it. I left space empty" (Audio file 5.1, 0:15-2:34) so that the details of the garment could determined in the draping process. Designers D and B chose not to sketch at all, but to directly begin their draping process.

For their draping process, Designers A and C sketched a full collection and then chose one of the sketches to drape prior to seeing any of the provided fabrics. Designer F sketched a collection, but instead of selecting one of the sketches to drape, she draped a new design using the same inspiration image as was used in the sketching process. Even though she did not choose a sketch to drape, the resulting draped design was cohesive with the sketched collection. It appeared to me as if the same ideas from the sketched collection translated over into the draped garment, to the point that the draped garment could have been added to the sketched collection as the 6th garment.

Some designers viewed sketching as a necessary predecessor to the draping process, while other designers felt restricted by sketches. Designer A, who participated in a sketching

session prior to draping, was originally asked to drape a garment that he had not drawn in the sketched collection, but he later decided and stated that he did not feel comfortable doing that, and selected one of the sketched garments to drape. Designer F, who participated in a sketching session but draped a garment that was not sketched ahead of time, referred to the sketching process as "a form of loosening your creativity so that you have more ideas to go to the form with" (Audio file 2.2, 7:03-8:37). Designer D, who did not participate in a sketching session stated, "I don't want to draw anything out. I just want it to be sculptural. However the fabric lands and however it forms to the body…" (Audio file 3.1, 1:00-1:37). It was interesting that both the designers that did not sketch at all used only muslin fabric in their draping process, but the correlation between these two facts remains unclear. Sketching and draping both provide the designers with different mediums for idea generation, one in 2D space and one in 3D space. Favoring of one over the other, or a combination of both may indicate differences in cognitive processing on the part of the designers, however, further study would be required.

6.43 The Relationship of Fabric Selection to Sketching Processes

	A	***B***	***C***	***D***	***E***	***F***
Draping Fabric(s) Used	Muslin (intended as lace), satin, chiffon	Muslin	Jersey, muslin	Muslin	Muslin, chiffon	Jersey, chiffon, muslin, stretch silk

(Table 4)

Designers who sketched a collection previous to draping were inclined to select fabrics from those provided that best matched their previously formed fabrication intentions that had originated during their sketching process. Ideas of fabrication explained by the designers were carried over into the selection of fabrics for the draping session.

Based on the responses in the post-design interviews on fabrication, it seems unlikely that the inspiration for the draped designs for Designers A, C, and possibly F could have been derived initially from the fabric, since they had already been forming ideas of fabrication during the sketching process. Designer A stated that for him the sketch "is really just the silhouette and how I wanted to style and portion it. When you actually have the fabric, things always change. So, it becomes an interpretation...another one would be completely different, I'm sure" (Audio file 1.2, 6:20-7:05).

These designers indicated in the interview that they had made certain determinations about fabrics during the sketching session. Designer A indicated that he was not able to choose the most ideal fabric for the draping, which suggests to me that he already had formed ideas about the fabrics in the sketching session, he stated that "a double faced satin would add a little bit of rigidity, since its so soft looking and so hard at the same time" (Audio file 1.1, 25:49-26:26). The fabrics they these designers chose for the draping session were ones that best matched their previously determined fabric intentions formed during the sketching process. For example, Designer C chose two fabrics, a knit jersey for the top portion of the dress, and cotton muslin for the skirt portion. Because the sketches were completed prior to seeing the fabric selections, it is apparent that the fabric was chosen based on its suitability to the intended fabric for the design created in the sketch. This is not to say, however, that new ideas or inspiration were not discovered in the fabric during the draping processes of these designers, as design is an continuous process. Designer F stated "it is hard to coincide the fabric sometimes because I can get ideas from the fabrics too" (Audio file 2.2, 5:08-6:40).

In contrast to forming ideas through sketching, Designers B, D, and E appeared to draw inspiration for their design from the fabrics themselves. However, Designers B and E were the

only ones to explicitly state on their pre-design questionnaire that they draw inspiration from fabric. Designers B and D did not complete any sketches prior to draping, and they both chose only muslin fabric to drape with. In draping, muslin fabric acts as a stand in for other fabrics. Designers would not actually create their design from muslin fabric, but use it as a way to generate ideas about form and design details which could then be translated into other fabrics at a later stage. Designer E chose to complete a quick croquis sketch prior to draping. He asked to view the fabrics and made his selection of the choices provided before creating the croquis sketch. In the post-design interview, Designer E referred to the tiling on the roof line as appearing to him to be "more unbalanced, sheer" (Audio file 5.1, 0:15-2:34). It is not known if he had made the association between the tiles and using the sheer fabric before or after he had seen the fabric selection, however, it most likely occurred after he saw the fabric selection since he would not have know that there would be a sheer fabric available. Therefore, Designer E used the fabrics he selected to inform the sketch.

6.44 To Sketch or Not to Sketch

	A	***B***	***C***	***D***	***E***	***F***
Staring Point of Design	Taken directly from final collection sketch	Inspiration and fabric	Taken directly from final collection sketch	Inspiration and fabric	Sketched croquis	Continuation of ideas from sketching process

(Table 5)

Designer D, who did not chose not to complete any sketches prior to beginning the draping process, referred to the constraints imposed by trying to exactly drape a previous sketch and how the draping process was one that required 3D thinking, as opposed to the 2D thinking involved in a sketching process. Designer D stated,

"I think draping helps you to think of something three-dimensionally as opposed to something two-dimensionally... You can draw anything, but you can't necessarily make it. I think if I would have drawn something and then tried to drape it would have been much more frustrating, because you're set to make something work as opposed to working with what you have, and then just letting it go. So that's why I didn't want to draw anything, because I didn't want to have this set things and get frustrated because I couldn't make it work. I'm just going to see what works, and if it works it works and if it doesn't it doesn't, and then I'll just do something else."

(Audio file 3.1, 12:27-14:58)

Similar to Designer D, Designer B did not complete any sketches prior to beginning the draping process. In the post-design interview she stated, "I like to sketch on the computer. I don't like to sketch by hand. The computer is more natural for me…" (Audio file 4.1, 6:40). It is not known if the reason she did not complete any sketches prior to draping was due to not being able to use a computer for sketching or due to another reason.

Although Designer F participated in a sketching session and sketched a full collection, she did not select one of the previously created sketches to drape for much of the same reasons as stated by Designer D. Both of these designers identified feeling restricted by the constraints imposed by draping a previously completed sketch, and how sketching and draping required a different way of thinking about a design. Both stated that a designer can draw anything they like in 2D, but are forced to realistically execute that design in 3D, in which case, the intended 2D design may not be possible in 3D. Designer F stated,

"I think the difference is when you sketch you may not be able to execute [the draped design] the same way that you sketch it. So, I think that sketching can be a form of

loosening your creativity so that you have more ideas to go to the form with. Once you get to the form you know what you can do with the fabric, or you can see, you know how to make that line you've drawn in the sketch. Sometimes it is easy to make these fabulous sketches and then you don't really know how to make a seam go where it is in your sketch. I think I use sketching to get ideas, but then once I want to create something for real I go to the form and then it usually just grows from there…morphs into something."

(Audio file 2.2, 7:03-8:37)

Designer C, who did participate in a sketching session and completed a collection before beginning the draping process, acknowledged this difference between the 2D sketch and the 3D garment in his statement, "maybe [draping] is closer to the garments" (Audio file 6.1, 4:08-4:53). The statement "closer to the garments" is similar to the statements of Designers F and D, in which they describe how a sketch can be drawn, but the actual garment, created through a draping process, determines how realistically it can be recreated with actual fabric on a body form.

6.45 Designing in 3D

	A	***B***	***C***	***D***	***E***	***F***
Completion of Garment	Complete (front and back)	Incomplete (front only)	Complete (front right and back right)	Incomplete (front only)	Complete (front and back)	Incomplete (front only)

(Table 6)

While sketching has many benefits, it only allows the designer the ability to see their design in 2D, usually from a front only or back only view. The relationships in this view tend to primarily associate elements oriented left-to-right, and top-to-bottom. Draping has the ability to provide a 3D view of the garment in progress, and allows the designer to physically connect

the front and back as well as to see all angles of the garment. However, not all designer treat 3D space as such. Most of the designers that participated in this research only completed the front of the garment, and seemed to treat the 3D space of the body form more like a 2D front only view of a sketch. One important difference, however, is that even when only the front of the garment is completed, the design is still considering the 3D aspect of the volume of the fabric in relation to the body. In addition, many of these designers created side seams and evaluated the garment in progress from a side view, which also showed a consideration of 3D space.

Although Designer D stated, "I think draping helps you to think of something three-dimensionally as opposed to something two-dimensionally" (Audio file 3.1, 12:27-14:58), she did not exhibit this 3D thinking while draping on the dress form in the way some of the other designers did. Designer D stated in the post-design interview that she later regretted stopping the garment's design at the side seams. She stated,

> "Once I got halfway I wished I would have not cut some of the pieces, and completed the back as well. If I had thought about it in three dimensions, maybe I could have added a big train... but with all these pieces ending at the side seams it just seemed like too much to resolve within the time frame. It seemed to then take a backseat, and this isn't really the focus so I decided to focus on the front see what happens, which I think changed overall how I would have continued."
>
> (Audio file 3.1, 5:55-7:08)

Later in the interview she also stated,

> "I think if I would have continued the back of the top at the same time as I did the front of the top, it would have influenced the skirt and how I finished the skirt, because I started thinking maybe I wanted to have a train. And it just got overwhelming to try to figure out

how to do the skirt and something on the back since I had no back. I can't figure out the back because there's nothing on the back."

(Audio file 3.1, 7:08-7:50)

Designers A, C, and E created what could be considered a more complete design using both the front and the back of the dress form to create their design. In contrast, Designer B, D, and F created what could be considered a more incomplete design, where they only used the front of the dress form to create a garment. Although the unfinished garments may have been a result of the time limitation, the designers who were able to work simultaneously between the front and back of the form showed an ability to think in 3D. As opposed to completing the entire front section and then moving onto complete the entire back section, the designers who had more complete garments tended to move back and forth between the front and back sections, seeming to balance the two in space. Designer C only completed the right side of the garment, both on the front and back side, but is considered to have a more complete garment because the intended design was symmetrical, eliminating the need to mirror the left side as the pattern pieces would be the same only in reverse.

6.46 Fabric and the Form

Draping with different fabrics on the dress form will undoubtedly lead to different results in surface, line, and form. The designer's choices of fabrics have a direct impact on the desired outcome. For example, woven fabrics have the ability to create more volume and structure as opposed to knit, which will adhere to the surface of the body more closely. In their post-design interviews many designers referred to their desire for an intended outcome, but needed to change their design based how their selected fabrics were "reacting" on the form as they manipulated

them. For example, Designer A stated, "The fabric wasn't really reacting... I decided as I was working on it…" (Audio file 1.2, 10:07-10:35). This designer emphasized the importance of the fabric selection for a design process. He stated, "I need to look at fabrics. Based on the fabrics a lot of ideas come. (Audio file 1.2, 4:25-5:13), and that his design process usually begins with both the fabric as well as the inspiration. He stated that his usual design process "starts both ways [either searching for fabric to fit an idea or being inspired by the fabric] and then eventually becomes more about the fabric… The colors, fabrics, and inspiration are always somewhat done together" (Audio file 1.2, 5:18-6:15).

6.47 The Body and Proportion

All of these designers, aside from Designer B who began at the hips, started their draping process on the front of the dress form at the shoulders and tended to work from the top to the bottom of the form. Both of these starting points are not surprising, considering the relationship of a garment to the body. When looking at the front of a body, the garment hangs from the body's shoulders or hips, much like when it is hanging from a hanger in a closest, because these are the two widest parts of a woman's body.

It was apparent as the designers were draping that all of the designers viewed the body as divided into hierarchical sections, the largest of which breaks the body along the side seams, forming a front and back sections. Then, within each of those two sections, the next divide occurred along the waistline, creating a top and bottom section. Within the top and bottom sections the body is further subdivided in various ways depending on the particular design's seam lines. Therefore, the seam lines of a garment not only serve the functional aspect of conforming the fabric to the body, or joining multiple fabrics together, but also serve as lines breaking apart

3D space into more manageable subsections. This segmentation of the body relates back to the relationships between the whole and its parts as discussed under the design strategies.

From the designer's statements during the post-design interviews, many of the designers saw an advantage of draping as being more realistic in terms of the proportions of the fabric as they will relate to the body form. Most designers confirmed in their post-design interviews that their first consideration was of the body proportion. This is first observed as the proportion of the body to the fabric, specifically what areas were covered and what areas were left uncovered, followed by the proportion created inside of the fabric by changes in fabric type, textures, and seam lines on the surface of the body. Not surprisingly, proportion was observed to be an important aspect in the elements of design in a draped garment, because the elements cannot exist alone, they need to exist in relationship to another element. For example, something cannot be considered "long," "small," or "voluminous" without the relationship to something else, whether that is the body itself or another design element. Designer A stated that he began his design process by thinking about "how I want to break the proportion up, and then the different types of elements that I want to put into it. I basically repeat the same shapes, but I re-style them in a different way and I change different elements of it. This is the beginning of how I start something, with all the elements, but proportion first" (Audio file 1.1, 7:37-8:41).

The body is always the initial starting point for fashion design, therefore, the shape of the dress form becomes the important starting point for design. Designer A stated, "Because I have these curves, I want to accentuate that curve, and in doing so I made a [waist seam and belt] that I didn't begin with. I guess I knew what was going to happen. It was inevitable" (Audio file 1.2, 10:07-10:35). The designer stated later in the post-design interview that the waistline seam and belt were added to accentuate the waistline. He stated that the dress form that was used in this

design process had more curves than the ones they were currently using in the industry position, so the designer felt the need to emphasize and flatter the body shape.

Most designers also referred to their design decisions as thoughtful attempts to "flatter" the body through the minimization of certain areas, such as the width of the hips, and the emphasis on areas, such as the waistline or bust. For example, Designer A referred to his attempts to flatter the body form. He stated,

> "I thought of how to flatter the right side... once I felt that it was satisfying the criteria, I was happy. The same with the bottom. For example, when I was doing the chiffon part I was wondering where to put the first loop because if it is too high then it will stick out with your hip, if its too low it will make the hip look too big, and if its right on your hip it's weird. So, I was trying [many variations] and ultimately, for various reasons, I dropped it, but I was looking for the point where it would have been flattering. You don't want to accentuate those areas a woman would want to cover themselves."
>
> (Audio file 1.3, 7:08-8:36)

Designer E stated in his post-design interview that flattering proportion and fit was important to the draping process. When discussing the pleated section on the left side of the body he described the importance of the placement of the lines created by the pleats, "…you can't end a pleat here [on the hip], but I want a pleat here, exactly on the waistline, because if you don't end the pleat there it will be bulky and she will look fat. You don't want to do that. You don't want to make a girl look fat. So, when I play with [the fabric], it goes with the curves of the body" (Audio file 5.1, 6:50-7:40).

Although not explicitly stated by Designer D, it was clear that this designer considered proportion to the form by the placement of volume and line in relationship to flattering the body

through decisions such as a tight fitting waist and the volume accentuating the bust and hips. The lines also minimize the waist as they converge toward it, and accentuate the bust and the hips as they veer away from the waist. The proportion of design elements within the garment as a whole can be seen as an increase in size (for example, the difference in volume between the bust portion and the skirt portion) and number (for example, the differences between the number of lines that are created by gathers or pleats).

Designer F also did not specifically indicate the importance of proportion, but designed details such as the belt and collar, which appear to be accents more than features relevant to the overall structure of this garment. These details emphasize the shoulders and hips of the body. In addition, the decision to tether the gathers on the bodice in at the natural waistline (image F.16) emphasizes the natural waistline in this design.

Designer B showed the least amount of interest in fitting the fabric to the body form. She is currently a textile designer, and the main focus of her design appeared to be the texture applications of pleating and the intended appliqué. She did exhibit some attention to proportion and the form of the body through decisions such as accentuating the shoulders (image B.25), and minimizing the waist and hips through diagonal lines (image B.26). In the post-design interview, she stated that she had considered the functional aspect of her attempt to incorporate pockets into the design (image B.11, B.12, B.13, B.21) by stating, "I wanted the utility of pockets. I put the rosette design down there originally, but then I didn't like it and I moved it to the top' (Audio file 4.1, 3:02-3:54). The neckline straps (image B.42) were added after what would be considered the completion of the design as a functional consideration. She stated that these straps would allow the shoulder pieces to attach to the whole dress.

6.5 Further Study

Based on the discussion of this draping process research, I have identified several areas for future study:

- (Sketching Process) As the sketching process was not the main focus of this research, the analysis was limited in scope. However, further research into sketching processes of designers may be useful in understanding designer's cognitive processes in relation to 2D space and what relationships may exist between the sketching process and the translation of design ideas to 3D space. It may also be of interest to better understand the relationships between the designer's choice to sketch and their draping process. For example, why Designers D and B were the only two designers to both not participate in the sketching process and only use one fabric (muslin)? And, was the limitation of fabric important to the generation of ideas in 3D space?
- (Source of Inspiration & Translation) Further research on designers interest in the source of inspiration images could focus on why certain inspiration images, or features within an image, were favored by the designers, as well as the differences between within- and between-domain design elements used as inspiration and any possible correlation to design strategies, expertise, or ability. Why are certain design details more frequently translated in a source of inspiration? Are there any relationships or correlations between design element translation and a designer's strategies, expertise, or ability? Also, does the domain of the source of inspiration design elements, whether inside or outside of domain, correlate in any way to the level of ability of designer?
- (Design Elements & Principles) After the design elements are identified, how can we determine and define their continually changing and complex relationships to one another and to the body form throughout the design process? Also, how do the use of design elements and

principles relate to the current trends?

- Would it be beneficial to decode "designerly" ways of speaking into a more specific, or universal language based on the design elements and principles? For example, what exactly is meant by "things that are working" in a design, what is "flattering" the body, what is "simplifying", what occurs when a designer is "playing" with fabric, and how do designers create "drama" or "calm" in a collection? These are just a few examples.
- In the replication of this research, are these four action types still relevant and could there be others? How are the action types related to each designer's strategy and the creative ability of the designer?
- Is it possible to determine a level of creativity in a designed product or through the design process? And, what factors would be used to determine the measurement of creativity?
- How can this type of research help shape our teaching strategies in order for both designers and non-designers to learn about design?

6.6 Summary

This research questions the currently used methods in the design field, and introduces an exploratory quasi-experimental approach to design process research based on observation and retrospective verbal accounts of the draping processes of six individual fashion designers. Images and transcripts provide a unique view of the unfolding design process in real time and with minimal interruptions. From this data, each critical action by the designer can be determined and interpreted. The resulting 'Action Type' categories is a newly developed way of revealing insight into each designer's individual motivations and strategies. Because design is a continuous process, the source of inspiration image selected by each of the designers provides a necessary

starting point, and allows us to see more clearly how designers are borrowing, combining, layering, contrasting, and abstracting design elements and principles from both within- and between-domain sources. 2D and 3D design through combinations of sketching and draping processes, part-to-whole relationships, uses of design elements and principles, and play through idea testing stand out as important but differing strategies among the designers. The differences and commonalities between design process and creative thinking and problem solving processes also connects design research to a larger framework, and aids in decoding designerly ways of thinking, speaking, and acting.

References

Adams, J. L. (1986). Conceptual blockbusting : A guide to better ideas. Reading, Mass.: Addison-Wesley.

Akin, O., & Lin, C. (1996). Design protocol data and novel design decisions. In N. Cross, H. Christiaans & K. Dorst (Eds.), Analysing design activity (pp. 35-64). Chichester; New York: Wiley.

Akin, O., & Moustapha, H. (2004). Strategic use of representation in architectural massing. Design Studies, 25(1), 31-50.

Anderson, T. (1992). Drawing upon the eye, the brain and the heart. Art Education, 45(5)

Arnheim, R. (1962). Picasso's guernica; the genesis of a painting. Berkeley: University of California Press.

Arnheim, R. (1969). Visual thinking. Berkeley: University of California Press.

Arnheim, R. (1969). Visual thinking. Berkeley,: University of California Press.

Baldinger, W. S.,. (1960). The visual arts. New York: Holt, Rinehart and Winston.

Bartlett, F. C. (1958). Thinking; an experimental and social study. New York: Basic Books.

Bayazit, N. (2004). Investigating design: A review of forty years of design research Design Issues, 20(1), 16-29.

Bonner, J. T. (1988). Evolution of complexity by means of natural selection /. Princeton, N.J. : Princeton University Press,.

Casakin, H., & Goldschmidt, G. (1999). Expertise and the use of visual analogy: Implications for design education. Design Studies, 20(2), 153-175.

Celant, G., Koda, H., Armani, G., Solomon R. Guggenheim Museum., & Museo Guggenheim Bilbao. (2000). Giorgio armani. New York, N.Y.: Guggenheim Museum : Distributed by H.N. Abrams.

Cross, N. (1997). Descriptive models of creative design: Application to an example. Design Studies, 18(4), 427-440.

Cross, N. (2007). Editorial: Forty years of design research. Design Studies, 28(1), 1-4.

Cross, N., Christiaans, H., & Dorst, K. (1996). Introduction: The delft protocols workshop. In N.

Cross, H. Christiaans & K. Dorst (Eds.), Analysing design activity (pp. 1-16). Chichester; New York: Wiley.

Cross, N. (1982). Designerly ways of knowing. Design Studies, 3(4), 221-227.

Cross, N. (2001). Designerly ways of knowing: Design discipline versus design science. Design Issues, 17(3), 49-55.

Cross, N., Christiaans, H., & Dorst, K. (1996). Analysing design activity. Chichester; New York: Wiley.

Davis, M. L. (1996). In Sugg E. (Ed.), Visual design in dress (Third ed.). Upper Saddle River, N.J.: Prentice-Hall, Inc.

Dorst, K. (1996). The design problem and its structure. In N. Cross, H. Christiaans & K. Dorst (Eds.), Analysing design activity (pp. 17-34). Chichester; New York: Wiley.

Dow, A. W. (1913). Composition; a series of exercises in art structure for the use of students and teachers,. Garden City, N.Y.: Doubleday, Page & co.

Euclid., & Heath, T. L.,. (1956). The thirteen books of euclid's elements,. New York: Dover Publications.

Ewenstein, B., & Whyte, J. (2009). Knowledge practices in design: The role of visual representations as 'epistemic objects'. Organizational Studies, 30(7), 7-30.

Fashion now 2: I-D selects 160 of its favourite fashion designers from around the world(2005). In Jones T., Rushton S. (Eds.), . Cologne, Germany: Taschen.

Finke, R. A., Smith, S. M. & Ward, T. B. (1995). The creative cognition approach.

Fodor, J. (1998). When is a dog a DOG? Nature, 396, p. 325-327.

Fodor, J. A. (2000). The mind doesn't work that way : The scope and limits of computational psychology. Cambridge, Mass.: MIT Press.

Genter. (1989). The mechanisms of analogical learning. In S. Vosniadou, & A. Ortony (Eds.), Similarity and analogical reasoning (). Cambridge; New York: Cambridge University Press.

Ghiselin, B.,. (1952). The creative process;. [New York: New American Library.

Goel, V., & Pirolli, P. (1992). The structure of design problem spaces. Cognitive Science, 16(1), 395-429.

Goldschmidt, G. (1996). The designer as a team of one. In N. Cross, H. Christiaans & K. Dorst

(Eds.), Analysing design activity (pp. 65-92). Chichester; New York: Wiley.

Goldschmidt, G. (2001). Chapter 9: Visual analogy-A strategy for design reasoning and learning. In C. M. Eastman, W. M. McCracken & W. C. Newstetter (Eds.), Design knowing and learning: Cognition in design education (pp. 199-219) Elsevier Ltd.

Goldschmidt, G., & Smolkov, M. (2006). Variances in the impact of visual stimuli on design problem solving performance. Design Studies, 27(5), 549-569.

Goldschmidt, G., & Tatsa, D. (2005). How good are good ideas? correlates of design creativity. Design Studies, 26(6), 593-611.

Goldstein, H. I., & Goldstein, V. (1954). Art in everyday life. New York: Macmillan.

Hadamard, J. (1996). The mathematicians mind: The psychology of invention in the mathematical field. Princeton, N.J.: Princeton University Press.

Halpern, D. F. (1984). Thought and knowledge : An introduction to critical thinking. Hillsdale, N.J.: L. Erlbaum Associates.

Hasirci, D., & Demirkan, H. (2007). Understanding the effects of cognition in creative decision making: A creativity model for enhancing the design studio process.19(2-3), 259-271.

Hennessey, B. A., & Amabile, T. M. (2010). Creativity. Annual Review of Psychology, 61(1), 569-598.

Higgins, J. M. (1994). 101 creative problem solving techniques : The handbook of new ideas for business. Winter Park, Fla.: New Management Pub. Co.

Hogarth, R. M. (1987). Judgement and choice the psychology of decision.

Holland, J. H. (1986). Induction : Processes of inference, learning, and discovery. Cambridge, Mass.: MIT Press.

Horyn, C. (2005, January 25, 2005). Galliano, connecting the periods. The New York Times,

Jin, Y., & Chusilp, P. (2006). Study of mental iteration in different design situations. Design Studies, 27(1), 25-55.

Johnson, M. (1995). The elements and principles of design: Written in finger jello? Art Education, 48(1), 57-61.

Karan, D., & Sischy, I. (2004). The journey of a woman : 20 years of donna karan. New York: Assouline.

Kidd, L. K., & Workman, J. E. (1999). Assessment of creativity in apparel design. Clothing and Textiles Research Journal, 17, 58-64.

Kim, I., & Uh, M. (2002). Apparel making in fashion design. [New York]: Fairchild Publications.

Koestler, A. (1978). Janus: A summing up (First American ed.). New York, NY: Random House, Inc.

Koestler, A.,. (1964). The act of creation. New York: Macmillan.

Köhler, W.,. (1947). Gestalt psychology, an introduction to new concepts in modern psychology. New York: Liveright Pub. Corp.

KoÌˆhler, W., 1887-1967. (1947). Gestalt psychology, an introduction to new concepts in modern psychology. New York : Liveright Pub. Corp.,.

Kosslyn, S. M., Osherson, D. N. & M.I.T. Press. (1995). An invitation to cognitive science. vol. 2, visual cognition.

Lacroix, C., & Mauriès, P.,. (1992). Pieces of a pattern : Lacroix. New York, N.Y.: Thames and Hudson.

Langer, S. K. K.,. (1951). Philosophy in a new key; a study in the symbolism of reason, rite and art. New York: New American Library.

Lawson, B. (1994). Design in mind. Oxford [England]; Boston: Butterworth Architecture.

Leonardo, , Richter, J. P., & Bell, R. C.,. (1970). The notebooks of leonardo da vinci. New York: Dover Publications.

Lieberman, J. N. (1977). Playfulness : Its relationship to imagination and creativity. New York: Academic Press.

Lloyd, P., Lawson, B., & Scott, P. (1996). Can concurrent verbalization reveal design cognition? In N. Cross, H. Christiaans & K. Dorst (Eds.), Analysing design activity (). Chichester; New York: Wiley.

Ludwig von Bertalanffy. (1950). An outline of general system theory. The British Journal for the Philosophy of Science, 1(2), 134-165.

Malcolm, D. C. (1972). Design: Elements and principles. Worcester, Mass.: Davis Publications.

Mandler, J. M. (2004). The foundations of mind : Origins of conceptual thought. Oxford; New York: Oxford University Press.

Mauriès, P.,. (1996). Christian lacroix : The diary of a collection. New York, N.Y.: Simon & Schuster Editions.

McCreight, T. (1996). Design language. Cape Elizabeth, Me.: Brynmorgen Press.

McDowell, C. (1997). Galliano. London: Weidenfeld & Nicolson.

Mednick, S. (1962). The associative basis of the creative process. Psychological Review, 69(3), 220-232.

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. The Psychological Review, 63, p. 91-97.

Mohrt, F. (1998). The givenchy style. New York: Vendome Press : Distributed in the USA and Canada by Rizzoli International Publications through St. Martin's Press.

Mohrt, F. (1998). The givenchy style. New York: Vendome Press : Distributed in the USA and Canada by Rizzoli International Publications through St. Martin's Press.

Neisser, U. (1976). Cognition and reality : Principles and implications of cognitive psychology /. San Francisco : W. H. Freeman,.

Oxman, R. (2002). The thinking eye: Visual re-cognition in design emergence. Design Studies, 23(2), 135.

Piaget, J.,. (1962). Play, dreams and imitation in childhood. New York: Norton.

Rothenberg, A. (1996). The janusian process in scientific creativity. Creativity Research Journal, 9(2&3), 207-231.

Rothenberg, A.,. (1979). The emerging goddess : The creative process in art, science, and other fields. Chicago: University of Chicago Press.

Rumelhart, D. E., McClelland, J. L., & University of California,San Diego.PDP Research Group. (1986). Parallel distributed processing : Explorations in the microstructure of cognition. Cambridge, Mass.: MIT Press.

Runco, M. A. (2003). Commentary on personal and potentially ambiguous creativity: You can't understand the butterfly unless you (also) watch the catepillar 15(2&3), 137-141.

Runco, M. A. (1991). Divergent thinking. Norwood, N.J.: Ablex Pub. Corp.

Schön, D. A. (1983). The reflective practitioner : How professionals think in action. New York: Basic Books.

Schon, D. A., & Wiggins, G. (1992). Kinds of seeing and their functions in designing. Design Studies, 13(2), 135-156.

Scott, R. G. (1951). Design fundamentals. New York: McGraw-Hill.

Shelden, M. G. (1967). Design through draping. Minneapolis: Burgess Pub. Co.

Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: 11. perceptual learning, automatic attending, and a general theory. Psychological Review, 84(2), 127-90.

Simon, H. A. (1996). The sciences of the artificial (Third ed.). Cambridge, Massachusetts: The M.I.T. Press.

Simon, H. A. (2001). Creativity in the arts and sciences.23(2), 203-220.

Simon, H. A., & Newell, A. (1972). Human problem solving. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Simon, H. A., & Newell, A. (1975). Computer science as empirical inquiry: Symbols and search.

Smith, G. J. W. (2005). How should creativity be defined? Creativity Research Journal, 17(2), 293-295.

Smolucha, L. (1996). The visual arts companion. Englewood Cliffs, N.J.: Prentice Hall.

Stevens, P. S. (1974). Patterns in nature. Boston: Little, Brown.

Strauch-Nelson, W. (2007). Magical words. Art Education, 60(4), 12-16.

Visser, W. (1996). Use of episodic knowledge and information in design problem solving. In N. Cross, H. Christiaans & K. Dorst (Eds.), Analysing design activity (pp. 271-290). Chichester; New York: Wiley.

Visser, W. (2009). Design: One, but in different forms. Design Studies, 30(3), 187-223.

Volkema, R. J. (1983). Problem formulation in planning and design. Management Science, 29(6), 639-652.

Von Bertalanffy, L. (1950). An outline of general systems theory. The British Journal for the Philosophy of Science, , p. 134-165.

Waldrop, M. M. (1992). Complexity: The emerging science at the edge of order and chaos /. New York : Simon & Schuster,.

Wallace, D. B., & Gruber, H. E. (1989). Creative people at work : Twelve cognitive case studies. New York: Oxford University Press.

Wallas, G.,. (1926). The art of thought,. New York: Harcourt, Brace and Company.

Welling, H. (2007). Four mental operations in creative cognition: The importance of abstraction. Creativity Research Journal, 19(2), 163-177.

Yin, R. K. (2009). Case study research : Design and methods (Fourth Edition ed.). Thousand Oaks: Sage Publications.

Yokochi, S., & Okada, T. (2005). Creative cognitive processes of art making: A field study of a traditional chinese ink painter. Creativity Research Journal

APPENDIX A

Pre-Design Questionnaires

Participant #	**A**
Age	**28**
Gender	**Male**
Years formally educated in fashion design	**4**
School(s) attended	**Parson School of Design**
List of past fashion classes taken	**Concepts development, studio methods, fashion history, fashion illustration, machine knitting**
Other studio art education	**Oil painting, water color painting, portraiture, figure drawing, graphic design**
Years working in the fashion industry	**7 years, including internships**
Approximate number of collections developed and executed	**15**
Position and target customer in current industry position	**Previously a fur designer for Oscar de la Renta. "About to start a new position as design director for a high end luxury brand. Target = woman who seek quality with affluence. Leisure class or executive. Not interested in high impact branding, but wants people to assume and ask what she's wearing.**
Most often used design methods	**Full figure sketching, flats, draping, pattern making, sewing**
Design strategies	**Starting with basic shapes then evolving. Experimenting with treatments or materializations and applying.**
Where do you draw inspiration?	**The world, other admirable designers, street fashion, personal history, my emotions, an idea of a mood or woman, traveling, a singular detail, music, film, art.**

Participant #	**B**
Age	**28**
Gender	**Female**
Years formally educated in fashion design	**6 years**
School(s) attended	**2001-2005 University of Cincinnati, B.S. in Fashion Design & 2007-2008 Central Saint Martins College of Art and Design, M.A. in Textile Futures**
List of past fashion classes taken	**Design construction I-IV, Design communication I-III, Fashion history I-II, patternmaking, knitting, tailoring**
Other studio art education	**Textile surface design and manipulation, wallpaper design competition**
Years working in the fashion industry	**1 year for fashion/textile magazine**
Approximate number of collections developed and executed	**Childrens (1), womenswear (1), menswear (1), knitting (1), ready-to-wear (1)**
Position and target customer in current industry position	**Freelance contributor for magazine**
Most often used design methods	**Computer illustration/sketch, draping**
Design strategies	**Inspiration, design evolution**
Where do you draw inspiration?	**Trends, science, art, *fabric***

Participant #	**C**
Age	**33**
Gender	**Male**
Years formally educated in fashion design	**7 years**
School(s) attended	
List of past fashion classes taken	**B.A. Fashion Design (in Korea), M.S. Fashion Design (in USA)**
Other studio art education	**MA in Textile Design (in Korea)**
Years working in the fashion industry	**About 5 years**
Approximate number of collections developed and executed	**3**
Position and target customer in current industry position	**I was working with a Korean Designer Boutique (designer level pattern maker), textile designer 12 02 textile corporation), intern at Castelbajac in Paris (designer level), and freelance designer at Wal-Mart (mass market). Now, I have my own collection in New York (designer level).**
Most often used design methods	**Rough hand drawing, draping, computer flat sketching**
Design strategies	
Where do you draw inspiration?	**Movie…painting… all things.**

Participant #	**D**
Age	**29**
Gender	**Female**
Years formally educated in fashion design	**Bachelor of Science in Fashion Design, 5 year program**
School(s) attended	**University of Cincinnati**
List of past fashion classes taken	**Design-Drawing, draping, etc. for degree requirements**
Other studio art education	**Architecture major for 3 years, have taken various drawing/mixed media classes for leisure**
Years working in the fashion industry	**7**
Approximate number of collections developed and executed	**1 per season, 4 seasons per year, approx. 28**
Position and target customer in current industry position	**Designer/Senior Designer for infant girl and layette (0-24 month size range) for large specialty retail chains (ex: GAP)**
Most often used design methods	**Hand sketch of flat and illustrations which are then transferred to computer flat sketches for production**
Design strategies	**I do a lot of iterations of an idea to find the best solution.**
Where do you draw inspiration?	**Everywhere. I especially love vintage finds. In my professional life we look to European trend services (Peclers & WGSN) as well as travel both domestically (LA, Austin) and overseas.**

Participant #	**E**
Age	**32**
Gender	**Male**
Years formally educated in fashion design	**Total of 8 years:** **BFA, 1998-2002 (Fashion)** **Portfolio grant, 2002-2003** **MSC, 2003-2006 (Fashion)**
School(s) attended	
List of past fashion classes taken	**Fashion art, surface ornamentation, history, knitting, tailoring, draping, accessories design, software (fashion), patternmaking, couture sewing**
Other studio art education	**2D animation, sketching, painting, macramé, hand weaving, sculpture (clay), mix media, visual media**
Years working in the fashion industry	**4 years**
Approximate number of collections developed and executed	**2 collections (school), menswear (2), girls (3), boys (3), infant-toddler (5)**
Position and target customer in current industry position	**Senior Designers, Disney newborn/kids, middle class mom**
Most often used design methods	**Computer flat, full-figure hand drawing**
Design strategies	**1) inspiration and fabric together** **2) color season** **3) trends** **4) sketch collection** **5) draping** **6) single element which brings collection together**
Where do you draw inspiration?	**Fabric, pictures, street, travel**

Participant #	**F**
Age	**30**
Gender	**Female**
Years formally educated in fashion design	**6**
School(s) attended	
List of past fashion classes taken	**Illustration, draping, textile science, sportswear, pattern making, CAD, tailoring, history of costume**
Other studio art education	**Painting, figure drawing**
Years working in the fashion industry	**5 (about)**
Approximate number of collections developed and executed	**2**
Position and target customer in current industry position	**Missy wholesale assistant**
Most often used design methods	**Computer flat sketch, prefer hand drawing**
Design strategies	**Interest of design, the line quality**
Where do you draw inspiration?	**Things that I have seen around me from day to day, as well as current trends.**

APPENDIX B

Consent Form

You are invited to take part in a research study on apparel design creative process through draping methods. This is a study of actual design processes, how apparel designers design and how they develop and apply design ideas from a source of inspiration into actual garments. Please read this form carefully before agreeing to take part in the study. The experiment facilitator will carefully review each section with you and answer any questions you may have before you agree.

What the study is about: The purpose of this study is to understand the creative process in apparel design process. We will investigate how designers design from the displacement of concepts from source (inspiration) to target (garment design) and how they use visual analogy and relevant prior knowledge to solve actual design problems. This research process will consist of direct observations (participant observation) in semi-controlled design experiments, video recording of the emerging design, tape recording of think-aloud protocols, and semi-structured pre-design and post-design interviews. All the methods used -observations, interviews, protocol analysis- will be geared toward uncovering the unfolding process as an effort to better understand the nature of creativity in design.

What you will be asked to do: If you agree to be in this study, we will conduct a semi-structured pre-experimentation interview with you that will be recorded with you permission. This interview will include questions about your creative background and design experience. At the end of this interview we will inform you about the 'think aloud' method of Protocol Analysis, that you may utilize if you so choose. We will then ask you to participate in a four hour design session. You may choose your source of inspiration. Designers may stop early if finished with the draped garment before the allotted time. We will provide you with a dress form, fabric, and necessary tools for draping. We will be recording video and audio during this time with your permission. After each session, you will review sections of the videotape with the experiment facilitator and be asked any clarifying questions. The pre- and post-design interviews should take between 20-30 minutes to complete each. Confidentially can be guaranteed if the participant wishes. All audio will be transcribed and video stills can have faces blurred. If the participant chooses, they may also take part in an exhibition of participant design process, product, and analysis following the study. Participants may also choose to keep confidentiality during the exhibition, only being identified by an assigned number.

Risks and benefits: I do not anticipate any risks to you participating in this study other than those encountered in day-to-day life. Possible benefits include a better understanding of your own design process and problem solving skills.

Compensation: The participants will not be compensated for their time.

Confidentiality: This study will be recorded using video and audio recording devices. The record of your name, information, and identity will be kept private. In any sort of report we make public we will not include any information that will make it possible to identify you, including name or video/audio footage. Your face will be blurred in any stills taken from the video and made publicly available. All audio will be transcribed to prevent voice recognition. Research records will be kept in a locked file in a locked room and only the researchers will have access to the records. The video/audio will be destroyed within one year of participation in the study, unless the participant agrees to its possible use in future studies. Participants may agree to take part in a design exhibition following the completion of the study. Confidentiality of identity can still be guaranteed during the exhibition by blurring faces in video still and identifying participants only by an assigned number. However, participants may choose to waive their right to confidentiality and be identified in the exhibition by name and face.

Taking part is voluntary: Taking part in this study is completely voluntary. You may skip any questions that you do not want to answer. If you decide not to take part or to skip some of the questions, it will not affect your current or future relationship with Cornell University. If you decide to take part, you are free to withdraw at any time.

If you have questions: The researcher conducting this study is Lindsey Commons. Please ask any questions you have now. If you have questions later, you may contact Lindsey at lmc272@cornell.edu or at (###) ###-####. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) at 607-255-5138 or access their website at http://www.irb.cornell.edu. You may also report your concerns or complaints anonymously through Ethicspoint or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.
Your Signature _____ Date _____
Your Name (printed) _____

In addition to agreeing to participate, I also consent to having the interview and design process recorded using audio and video devices.
Your Signature _____ Date _____

I consent to the use of any images (with faces blurred) of my design or design process nd any transcribed audio be used for publication or public display, including the exhibition following the study.
Your Signature _____ Date _____

I consent to the use of the video or transcribed audio of my design process for future studies or publications by Cornell University exceeding one year from participation.

Your Signature _____ Date _____

I consent to be contacted for possible, not obligatory, participation in future studies at Cornell University.
Your Signature _____ Date _____

Signature of person obtaining consent _____
Date _____
Printed name of person obtaining consent _____
Date _____

This consent form will be kept by the researcher for at least three years beyond the end of the study and was approved by the IRB.